







NAVAL WAR COLLEGE,
Newport, R. I.

CASE.....#.....
SHELF...74.....
NO.....105707...

NAVAL WAR COLLEGE,
Newport, R. I.

NOV 4 1902

10
122
✓
For the use of Officers only.

NAVAL WAR COLLEGE,

NEWPORT, R. I.

ABSTRACT OF THE COURSE,

1900.

**WASHINGTON:
GOVERNMENT PRINTING OFFICE.**

1901.

NAVAL WAR COLLEGE
LIBRARY V

Call }
No. }

420

F8

Acc. No.

1950

105707

FEB 9 1962

Restr.
Coll.

ABSTRACT OF THE COURSE

AT THE

NAVAL WAR COLLEGE, 1900.

The summer course at the War College in 1900 was very instructive, and perhaps developed the usefulness of the college as an instrument for solving problems of war to a greater extent than in any other year. The class contained a larger proportion of officers of mature experience than ever before, and also officers of the Marine Corps, Army, and Revenue-Cutter Service, thus rendering it more efficient for the consideration of the many mixed questions calling for solution, and for the important study of combined operations than if it had contained officers of one branch only.

The object of the college course is now, as it always has been, to encourage and promote the study of naval war as a science. The yearly problems are the foundations on which the studies of the course are based, and while the solutions are useful in forming general war plans, their indirect utility is most marked in the individual study induced by the number of minor problems which arise for consideration. Many of these from their nature admit of no exact solution and can be answered only by the consensus of opinion of those who have investigated them. Discussion thus becomes a potent factor, and both intensifies the interest of the subject and increases the value of the conclusions reached.

The college will, in all probability, continue to be misunderstood by those who have never attended a course. It neither has, nor can have any connection with any other school of training or instruction. It is the outgrowth of a demand by officers of the Navy for some recognition and study of the ever-existing principles and higher laws of war, which have underlaid all campaigns since the world began, and it best serves its purpose when it draws officers of experience away from the narrowing influence of the routine, and the mere technique of the profession into the study of naval war as a whole. In this will be

found ample scope for individual intellect and enthusiasm, and under the conditions of the college course, whatever good may be attained by one becomes part of the knowledge and experience of all.

The field in which the college can profitably work is large, and is increasing in importance. While we must continue to keep pace with the advanced mechanical thought of the day in the construction and equipment of our battle fleet, and must endeavor to perfect the instrument put into our hands by the training and instruction of its personnel, there yet remains the vital question of studying how this formidable weapon shall be used in war to accomplish the purpose of its creation—the advancement of the national interest.

The aim of the War College is to encourage study and attain all possible results in this most important field, and whatever success has been attained in the past it is hoped may be exceeded in the future as the influence of the college becomes more widely recognized.

One of the most interesting features of the whole summer was the scheme of practical exercises conducted by the cooperation of the North Atlantic Squadron with the various military and naval stations at Newport. The results attained were of great value and were interesting to all participants, whether afloat or ashore. They indicate a line of work which may be most profitably extended, and emphasize the fact that the location of the War College is by far the best that can be found on the Atlantic coast, for nowhere else can exercises of this kind be so well conducted.

The Hon. Frank W. Hackett, Assistant Secretary of the Navy, in his address delivered at the annual opening of the Naval War College, June 2, 1900, said:

“Here you proclaim that study and hard thinking are in order. A battle on land or water means that somebody has been working out a plan. These various plans in time have evolved rules and maxims based on certain principles that prove of more or less value as guides for future action. What these rules are, how best to apply them, when they can be safely violated—these, and such as these, are vital topics with which the Naval War College deals. All that is intellectual in the make-up of the officer responds gladly to the prospect of an exercise thus invigorating and broadening.

“In war, as in every other struggle, the test of success is that the commander works out the largest results possible with the instrument put into his hands. He that waits that he may have something better

to go ahead with, never wins a battle. The effective force to be got out of a ship depends on the man who handles her. These, to be sure, are but commonplace observations, but nevertheless, the idea they embody ought ever to be present to the mind of an officer fit to command.

“Obviously, the naval profession lies open to very much the same influences that operate in other professions. I submit the inquiry whether it be the part of wisdom to attempt to run counter to the workings of what clearly is the trend of development in the higher walks of business, of science, and of the learned professions.

“There can be no lowering of the standard. Matchless as is the record of past achievement, the captain of the future must subject himself to a test even more rigid. He shall evince more ardor than Paul Jones; more skill than Hull; more daring than Decatur; more firmness than Farragut.

“First, and always, he shall be a sailor—shall excel in seamanship. Sails and topgallant masts have disappeared, but the mystery of the ocean remains. To read wind and current; to have his ship in hand through storm and calm; to keep her staunch and trim, and at her best—this is to be in truth a sailor. The aphorism of better than a century ago has not lost its point, that ‘The winds and waves are always on the side of the ablest navigators.’

“Your officer is to carry a stout heart—shrink from nothing—take the risk. He must harbor a comprehension of that miracle of human ingenuity beneath his feet—the modern battleship—her build, her motive power, her every capacity, her death-dealing guns, her armor shield, her nicely adjusted mechanisms; the almost countless nerves trembling with life and meaning. He must be able to boast some acquaintance with chemistry, electricity, hygiene, some familiarity with diplomacy, and with the outlines of international law. We would have him conversant with human nature under a blue flannel shirt. A master of discipline, it will go hard with him if he do not possess decision of character to a rare degree of perfection.

“See what a list of virtues you are making out for the brain of one man to keep in exercise. If a note of warning lurk in these suggestions, it is that we take precious good care lest our gentlemen of the Navy be required to accomplish too much.

“Dr. Johnson is every now and then quoted as having said: ‘Knowledge is of two kinds. We know a subject ourselves, or we

know where we can find information upon it.' In like manner, it is to be observed, that while the commander of a ship may have mastered fairly well one or two subdivisions of the many affairs under his control, he sees that for this or that other department, of which he knows something, he can rely upon a subordinate who is specially trained therein.

"Let us avoid imposing upon a ranking officer a burden of multitudinous details. His talent and energy are pledged to a service infinitely more important. His business is to study deep, and again and again to reflect upon, the problem how to perfect himself in the use of that which his country has intrusted to him wherewith to meet and destroy the enemy. This it is to compass the art of war in a larger aspect, to rise above what is petty, and to deal with what is grand and enduring.

"You will observe thus far we have had in mind the commander of a single ship only. A course of training to fit the officer for this responsible post is begun at the Naval Academy, and continued after graduation for every day that he is on duty.

"But the aim of the Naval War College is to lead him onward and upward, that he may grasp the full meaning of the problem how to bring many ships together into the squadron, or the fleet, and then how to deal with them thus combined and unified.

"Who can say of this or that young officer that he may not on some bright morning in the future meet the crucial moment of his life at the head of a line of battle ships? He who wears the uniform must in all seriousness ask himself, 'What am I to do if I have a campaign to plan, a victory to gain?' There is but one answer: 'I must consult the past. I must gain ready knowledge of what the great sailors of history have done. I must look with clear vision into the principles upon which they went forward to the honor and glory of their country.'

"Such is the lofty theme to which you here would dedicate the thoughts of your noble profession. Nor is it too much to hope of those who resort hither that each in turn will find himself inspired with the determination to walk 'Along the far Eastern uplands, meditating and remembering.'"

The special study of the course for 1900 was the defense of the Pacific coast and the newly acquired groups of islands in the Pacific Ocean, and the problem of the year was drawn up with this end in view.

The officers detailed for attendance were two captains, eleven commanders, seven lieutenant-commanders, one lieutenant-colonel, one captain and four lieutenants of marines, two lieutenants of United States Artillery, and two lieutenants of the United States Revenue-Cutter Service.

The work was divided under the following heads:

(1) Lectures, (2) War problems, (3) War charts and defense plans, (4) Tactical situations, (5) War games, (6) Reading, (7) International law. This was supplemented by a course of instruction at the Naval Torpedo Station for those who so elected.

LECTURES.

The following lectures were delivered:

Explanation of the course.....	By the President.
War (2).....	By Rear-Admiral S. B. Luce, U. S. N.
The Conduct of Battles (3)	By General Francis J. Lippitt.
Napoleon's Campaigns in Northern Italy	
(6).....	By Captain A. T. Mahan, U. S. N.
Naval Strategy (5)	By Captain A. T. Mahan, U. S. N. (Owing to the absence of Captain Mahan, these lectures were read by the college staff).
Naval Tactics (3)	By Captain H. C. Taylor, U. S. N.
Coast Defense (7)	By Captain C. F. Goodrich, U. S. N.
The Strategy in the North Atlantic in	
1898 (1)	By Captain F. E. Chadwick, U. S. N.
Spanish-American Diplomacy (1)	By Captain F. E. Chadwick, U. S. N.
Strategic Features of the Northwest with-	
in the area of the Problem (1)	By the President.
International Law (9)	By the President.
Sea Power of Great Britain (1).....	By the President.
Formation of War Charts (1)	By the President.
Closing address	By the President.
Former Naval Operations within the area	
of the Problem (1).....	By Captain Asa Walker, U. S. N.
Preparation for War (1)	By Captain Asa Walker, U. S. N.
The Battle of Manila Bay (1)	By Captain Asa Walker, U. S. N.
Sea Power of Russia (1)	By Captain Asa Walker, U. S. N.
Attack and Defense (1)	By Captain Asa Walker, U. S. N.
Convoy and Transports (1)	By Captain Asa Walker, U. S. N.
Gettysburg (1).....	By Lieutenant-Colonel George B. Davis, U. S. A.
Errors of Gun Fire at sea (1).....	By Professor Philip R. Alger, U. S. N.

Ordnance and Armor (1)	By Professor Philip R. Alger, U. S. N.
Development of the Battle Ship and Com- position of the Fleet (1)	By Naval Constructor W. L. Capps, U. S. N.
Dockyard Administration (1)	By Naval Constructor W. J. Baxter, U. S. N.
Naval Hygiene (5)	By Surgeon H. G. Beyer, U. S. N.
The Military Situation on the Great Lakes (1)	By Major D. M. Taylor, U. S. A.
Submarine Mines (1)	By Major J. G. D. Knight, U. S. A.
Military Features of the Northwest (1) ...	By Major P. St. C. Murphy, U. S. M. C.
Sea Power of France (1)	By Lieutenant W. R. Rush, U. S. N.
Strategic Features of the Philippine Is- lands, Guam, and Hawaii (1)	By Lieutenant J. M. Ellicott, U. S. N.
Sea Power of Germany (1)	By Lieutenant J. M. Ellicott, U. S. N.
Sea Power of Japan (1)	By Lieutenant J. M. Ellicott, U. S. N.
Some Strategic Features of the Chinese Coast (1)	By Lieutenant J. M. Ellicott, U. S. N.
The Torpedo in Warfare (1)	By Lieutenant L. H. Chandler, U. S. N.
Submarine Cables in War (1)	By Captain G. O. Squier, U. S. A.
Security and Information (1)	By Lieutenant R. P. Davis, U. S. A.
How May the Revenue-Cutter Service Render Most Efficient Service in Time of War? (1)	By Lieutenant G. L. Carden, U. S. R. C. S.
In addition to the purely professional lectures, the following addresses were delivered by distinguished civilians:	
Opening address	By the Hon. F. W. Hackett, Assistant Sec- retary of the Navy.
The Monroe Doctrine (1)	By Professor Arthur Bushnell Hart, of Harvard University.
Insurgency (2)	By Professor G. G. Wilson, of Brown University.

The following lectures were prepared for delivery, but were not read, owing to lack of time:

Naval Scouts and Scouting (1)	By Lieutenant W. R. Rush, U. S. N.
Tactical Features of the Action Between the <i>Kearsarge</i> and <i>Alabama</i>	By Lieutenant J. M. Ellicott, U. S. N.

In this abstract only those professional lectures which the college desires to comment upon, and which have not been delivered in previous years, and which have not been printed, will be summarized. The opening address of the Assistant Secretary of the Navy has been published.

Rear Admiral Stephen B. Luce, U. S. N., delivered two interesting lectures under the title "War." These for the most part discussed the formation and proper and important functions of a general staff for the Navy, and the application of the War College methods in the study of naval tactics.

The lecturer stated as the object of his first paper, an effort to show that the mastery of the larger operations of war is achieved only by profound and continuous study, and that while all officers should be encouraged to pursue this study, the few having the greatest aptitude for it should be organized into a general staff and attached to the office of the Secretary of the Navy.

He says:

The principles of the science of war have found expression in the deeds and maxims of eminent soldiers and seamen.

Great captains, gifted by nature with genius for war, have illustrated its principles in their campaigns, and have then set them down in writing or have had them recorded by competent writers. These various contributions are the foundations of military history.

Military history should be made the subject of careful study.

Nor is study alone sufficient; the earnest student should ponder upon what he reads and thoroughly digest and assimilate it.

It is one of the oft-quoted sayings of Napoleon that "to acquire the secret of the art of war, one must read again and again the campaigns of Alexander, Hannibal, Cæsar, Gustavus Adolphus, Turenne, Eugene, and Frederick. Model yourself on them."

But of strategy, he has assured us that there is only one means of mastering it, and that is by incessant study and exhaustive thought.

And Nelson's legacy to us, observes a recent English writer, is that strategic and tactical study is that with which, above all things, a naval officer should occupy himself.

General Sherman is liberally quoted to show that during the civil war all the larger operations were conducted according to the teachings of the great masters of the art of war, and failures were due, in the main, to a disregard or ignorance of those teachings, and that it was the educated soldier who made the fewest mistakes.

He continues:

"The whole theater of war, which may embrace the four quarters of the globe, is the province of strategy," remarks one military writer. "The field of battle is the province of tactics. It is the object of strategy so to direct the movements of a fleet, that, when the decisive collision occurs, it shall encounter the enemy with increased relative advantage. When the movements of one of two fleets have been so directed

as to increase the chances in its favor, by forcing the enemy either to engage at a disadvantage or to abandon a strategic front under penalty of worse disaster, there is proof of a power which differs from the mere ability to fight." This power is an intelligent directive force at headquarters. The principles of naval strategy are amply illustrated in the Trafalgar campaign, during which the English Board of Admiralty was pitted against no less a master of the art of war than Napoleon himself. It is needless to say that nothing but a thorough knowledge of their profession on the part of the Admiralty, and unremitting attention to every move in this great game of war could have insured success. It is equally needless to say that the routine business such as absorbs most of the time and attention of our chiefs of bureaus is utterly incompatible with the absorbing interest required by the business of war.

All military authorities agree as to the great value of a general staff.

If such a body of specially trained officers is necessary to a military man, an educated soldier, how much more necessary is it to a civilian Secretary of the Navy.

For purposes of war, some must fabricate material; while others again must direct those who utilize that which has been fabricated.

One man may make a gun, but may not be skillful in its use; another man may not be able to make a gun, but can use it, when made, with unerring skill; while a third may not be able to make a gun nor use one efficiently, but may have the faculty of instantly placing the man with the gun in a position where he will be able to do the most good. Moreover, this third man must be not only competent to state in advance the number and description of guns that will be required, and the number of men skilled in their use, but indicate the exact spot they must occupy in in the hour of need. Now we have the first and the second type of men, but the third set we need, and the production of that class is what we are now aiming at, the production, in short, of officers qualified to fill positions on the general staff as that term is used by military writers.

In his second paper, Rear-Admiral Luce reviewed briefly the study of naval tactics and the methods of investigation by the War College during previous years. He said:

To ascertain the tactical value of the several arms there were projected some years ago five courses or series of lectures, all converging to one and the same end—i. e., the study of naval tactics. First, came studies of the naval battles of the past, from which were derived the tactics of the single ship and of the fleet. Next, studies of the three arms—the gun, ram, and torpedo. Well-known specialists in the naval profession prepared and delivered these lectures. The fifth course of this group was devoted to military history, and was prepared by officers of the United States Artillery. The papers had for their object the study of the general principles of military science with a view to their application to operations afloat, and to thus enable the naval student to adopt, as far as practicable, the rules of the military art to the movements of the fleet. These lectures included military strategy, grand tactics, the principles of attack and defense, the art of rendering mutual support, etc.

Unfortunately this system of study was interrupted, to be resumed in essence later on in the series of lectures by Captain Mahan on Naval Strategy. His lectures embraced the rise and development of the great navies of modern times, with a critical review of the naval wars of the past two hundred years. Not of the sea fights alone, but included an examination into the origin, course, and net results of naval wars; the moral, military, and political effect upon the belligerents, and the ultimate bearing upon the lives of the nations taking part in them.

“These studies,”

Continued the lecturer,

“for extent and depth of research, breadth, and comprehension, skill in handling, and lucidity of diction, are without comparison in the literature of the profession.”

Of tactics in general the lecturer says:

“Tactics may be subdivided into (1) grand tactics, the tactics of battle or the combinations to be made in attacking, or in meeting an attack; (2) elementary tactics, or the evolutions of the signal book as providing the means and methods of carrying out the ideas and combinations of grand tactics.

“The first question which presents itself is consideration of the order of battle best suited to modern conditions; and the method of attacking this problem, and indeed every problem connected with naval warfare, is of the very highest importance. The analogy between military tactics and naval tactics, or between the operations of an army and of a fleet, merging at certain points into identity, enables us to adopt the comparative method of investigation; and this analogy is the central idea of this paper and the one sought to be impressed upon the mind as lying at the base of the whole college system.

“Commodore Parker says many years ago, in his preface to *Fleet Tactics* (1870), that his work ‘is simply an adaptation of military to naval tactics.’ Sir Howard Douglas states that the ‘movements of steam fleets, like those of armies, may be conducted on tactical principles best adapted to the great end of all preliminary maneuvers—i. e., the formation for battle in the most simple, speedy, and precise manner and so to combine offensive movements as to bring the superior force to bear upon some decisive point of attack and thus rendering the attacking force stronger upon that point than the enemy, whatever may be his entire numerical strength.’”

The lecturer concludes by saying that—

“If these applications of military principles to the art of naval warfare be correct, then a very important step has been gained, and we have only to follow in his lead; but if he (Sir Howard Douglas) is not correct, then the sooner the errors are exposed the better; but until this tactical question is satisfactorily solved there should be no rest.”

General Lippitt delivered a series of three lectures upon “The Conduct of Battles.” The lectures supposed an army consisting of several army corps, and numbering at least 100,000 men, all under

the command of a commander in chief. Most of the principles set forth, however, were equally applicable to a division, or even a single brigade, when acting independently.

During the lectures the principles enunciated were abundantly illustrated by examples cited from military history, from the earliest times down to the present day, and were accompanied by diagrams.

The headings of the lectures were as follows:

Lecture I.—Introductory; Order of Battle; The March to Battle; General Dispositions and Precautions; The Position; The Enemy's Position.

Lecture II.—Posting and Use of the Three Arms; Use of Artillery; Skirmishers; Reserves; Crotchets; Keys of the Battle; Concentration; Maneuvers; Of Attacks Generally; Where to Attack.

Lecture III.—Double Attacks and Turning Movements; Demonstrations and Feigned Attacks; Stratagems; Victory and Pursuit; Defensive Battle; Order of Battle and Position; Villages; Formations; Some Incidents of the Battle; Retreat; Rear Guards.

Twelve lectures were given by Captain Mahan, six in person, and the other six on Strategy were read by members of the college staff. These lectures were similar to those read in previous years, with slight changes and revisions to bring them up to date.

Three of the lectures by Captain Taylor on Naval Tactics, revised from previous years, were read by him.

Captain Goodrich delivered seven lectures treating of Coast Defense. Four of these were a summary of an extended series which had, in great part, been given in previous years. More copious reference to these lectures may be found in the Abstracts of Course for 1895, 1896, and 1897.

He found, in the respectable proportions which our new Navy has already attained, a reasonable guaranty of immunity from attack by any probable enemy, and therefore an end to the necessity of fortifying our harbors as if no Navy existed. He says:

“* * * The value of our remoteness from the great military powers of Europe, and the foreign policy, correct in the main, that has characterized our history practically ever since the war of 1812, can not be overestimated. These favoring circumstances, taken in connection with the steady growth of our Navy, render elaborate and frequent shore works unnecessary. * * *

“The defense of the coast by purely military or by purely naval means appears inadmissible for many reasons. If our entire shore line bristled with guns and if all points possessed complete equipments of the accessories of fixed defense, we should find ourselves, while fully guarded against attack, shut up behind a Chinese

wall with our coastwise and deep-water commerce destroyed or paralyzed. Our prestige would have vanished and our important interests, in foreign and especially in semicivilized countries, would be seriously jeopardized. Moreover, this pitiable impotence would be secured at an expenditure of money almost beyond imagination.

"On the other hand, to eliminate the fixed defenses and to intrust our defense to the fleet alone would none the less circumscribe its powers and would similarly involve a totally prohibitive outlay.

"Undoubtedly there are many opinions regarding the relations between fortified ports and a moving navy. No one denies the value, if not the necessity, of a certain amount of local defense for the ports of a maritime nation; but, then, no one knows where to stop. There must be a certain amount of local protection against attack from the sea, for those ports which are the producers and the renewers of our naval strength; and by local protection is meant fortifications, mines, and possibly a monitor or two. * * * The very best defense of our ports, both commercial and naval, and their communications is a powerful naval force. History is conclusive that the neighborhood of a possibly interfering naval force is a complete bar to any attack whatever."

The lecturer based his discussions of the part shore works play in the defense of ports upon General Abbott's lectures delivered at the college in previous years; and he found that the present satisfactory strength on the part of the Navy, on the one hand, and of fortifications, on the other, was more potent than an exaggerated and exclusive development of either.

Discussing the immediate objects of a war waged against us by a strong naval power the lecturer agrees with Commander Calkins in thinking that:

"* * * On the whole, the probable adaptation of maritime attack will follow the tradition of its predatory tendencies and be directed upon the national wealth of such a nation as the United States. This wealth must be assailed at commercial ports and along the lines of communications, coastwise and trans-Atlantic. Harbors will be blockaded and lines of railway will be cut at exposed points, as preliminary operations. Special industries supplying military stores, and all manufacturing plants capable of turning out war material will be marked for immediate destruction. * * * The centers of traffic and the means of circulation must suffer general ruin. Depredations will be directed to disorganize the social, industrial, and financial machinery, upon which all power of resistance is based."

The various features of such a war were discussed under the heads of:

1. Commerce destroying.
2. Blockade of commercial harbors.
3. Bombardment or ransom of towns.
4. Occupation of harbors and cities.
5. Local invasions and raids, as distinguished from general invasion.

“* * * Having thus considered what he may do, and passing now to the definite question already asked, ‘What is the enemy likely to do?’ our first concern is to discuss from his standpoint the choice of a theater of operations.”

Referring to the necessity of an admiral’s keeping his defending fleet concentrated, the lecturer says:

“* * * The decision to hold his ships together rather than to disperse them, however, would require immense moral courage to withstand the appeals of governors, mayors, chambers of commerce, and the press, all urging the local need of his ships, and it would further require the active approval and support of the Navy Department, such as was given during the late Spanish-American war to our first Cuban fleet.

“Yet, if he were to yield to these instances, he would not avoid the universal condemnation for his eventual failure to make good account of his ships caused by this very yielding. Fortunately, the precedents of the Civil War and the Spanish-American War warrant an admiral in expecting the earnest aid of the Navy Department. Its refusal, during the former, to station ironclads at Boston and New York, on the appeal of Governor Morgan and others, and during the latter, the refusal to break up one of our squadrons and scatter its ships along the Atlantic ports, are of too recent date not to convey comfort to our admirals in time of war.

“Nevertheless, this outside pressure is something that the admiral must anticipate, and against which he must firmly intrench himself in departmental approval.

“Our fleet, then, should take a post not too remote from the probable objectives of the enemy and in such a position as may be readily defended by the intricacies of navigation, by mines and land batteries, with several practicable exits to enhance the difficulties of masking, and with telegraph and rail communication reaching the interior and all coast points. So placed, even a very inferior fleet could not be neglected or despised, and if it fell but comparatively little below the force of the enemy, its influence as a peace-producing factor would be great. To abandon this strategical advantage and break the fleet up into insignificant tactical groups would be a grave error. * * *”

In two separate lectures Captain Goodrich went over in some detail the events of the war of the American Revolution and showed how large and unrecognized a share in the struggle was taken by sailors and by armed ships, whether serving under Congress, under a State, or under a letter of marque.

He held that the importance of the sailor during the Revolution, admitted by General Washington and others at the time, has gradually disappeared from the public mind, so that the statement that frequently there were three armed men afloat to one on shore fighting for the independence of the colonies comes as a shock.

The question of scouting was quite fully gone into and the ideas advanced in previous years were contrasted with the experiences of

the Spanish-American war. The lecturer saw no reason to modify his former views that big fast merchant steamers are best for this purpose. They should have little armament—to remove the temptation to engage with the enemy—should have their hold spaces filled with coal, and they should be taken over, with their officers and crews practically unchanged, into the service of the Government.

The college believes that the experience of the late war emphasizes the desirability of retaining the officers and crews, especially the engineer's force, of merchant steamers by regular enlistment in the Navy.

In a lecture on Some Points on Coast Defense brought out by the War with Spain, Captain Goodrich said:

"It will be my endeavor in the following remarks to show that our brethren in the Army had not been behindhand in their labors, and that our harbor defenses, although not developed to the extent recommended by the Endicott Board, were entirely adequate to the task of deterring the Spaniards from attacking any point worthy of strategic consideration or tactical effort. That a dread, approaching panic existed along our seaboard was notorious at the time and is notorious now, but that it was justified by any lack of readiness or power on the part of either the Army or the Navy, I am not prepared to admit. We were ready in both sources, and Spain knew it. This is the reason, and the inference is a fair one, why, in studying prospective hostilities with the United States, Spanish writers, so far as I am aware, said never a word about carrying the war into America, and why Cervera, conceded to be the most thoughtful and accomplished of his cloth in Spain, and Concas, his able chief of staff, are not known to have examined into even the possibility of such a movement; certainly they never counseled it.

"What the Spaniards might have done had not the Chief of Engineers made his report for the fiscal year ending June 30, 1897, is as promising a theme for speculation as the color of Venus's hair or the number of angels that can stand upon the point of a needle. Let us leave it to the causists. This, at least, we do know, that the report was made, was freely accessible to the Spaniards, and they did not operate upon our coast.

"Looking back upon the events of the spring of 1898, even without that knowledge which we now possess of what did happen, I think we should have been entirely justified in trusting the protection of our seaports to our harbor defenses, and in employing the fleet in strict accordance with the strategic demands of the situation."

The lecturer analyzed in detail the reports for 1897 and 1898 of the able Chief of Engineers of the United States Army and of his colleague the Chief of Ordnance. He found at every point where protection was needed—old forts and old guns—some of the types very effective against even modern ships, with more or less modern

guns and everywhere an abundance of submarine mines, and of ammunition.

“* * * As I run over this really formidable array of submarine mines and guns, ancient and modern, which were in readiness to welcome Cervera (I can find no better term), I confess to being unable to comprehend our own lack of confidence in our harbor defenses.

“Omitting the Penobscot and Kennebec rivers, and Port Royal, where nothing existed to attract the serious attention of the Spaniards and where the works, such as they were, were entirely adequate to the repelling of a naval dash or raid, it is, I think, quite within the limits of accuracy to assert that at every important point our fixed defenses were more than strong enough to drive off the Spanish fleet, even if the *Pelayo* and *Carlos Quintos* had been added to Cervera's command, and that a serious attempt to reduce these defenses would have subsequently entailed great labor and expense on the part of the Light-House Establishment in marking with buoys and light vessels the sites of Spanish wrecks off our coast.”

The lecturer discussed the evil effects of panic on the part of the public, to which Captain Mahan and Sir George Clarke ascribe the genesis of the flying squadron.

“* * * Panic is unreasoning, or it would not be panic. Upon us devolves the necessity of preaching, in season and out of season, the true doctrine that the wisdom and efforts of the two services may be trusted to do the best that can be done.

“So unreasoning is panic that it may be confidently asserted that no sum of money, however vast, expended in military defenses will in the future relieve the Navy Department of the pressure of the demands for local floating defense or necessarily decrease the apprehension in the public mind. If the experts in this branch are satisfied (as they should be) with the preparedness of our defensive works, it is time to announce the fact to our noncombatant countrymen and bid them quiet their fears. Those whose duty it is to protect them have not been negligent.”

The lecturer agreed with Sir George Clarke that—

“* * * By far the most important lesson of the war to the United States and to Great Britain is the danger that uninstructed public opinion may usurp the direction of naval policy.”

The college can not entirely coincide with the lecturer's views as to the actual state of preparedness of our coast defenses, though it is very probable the Spanish authorities were led, as the lecturer states, to regard them as sufficient.

Captain Chadwick lectured on The Strategy in the North Atlantic during the Spanish war.

He states that the declaration of the joint resolution of April 20, 1898, that the action of the United States was intended to free Cuba from Spanish dominion, made the capture and occupation of the island

the particular problem of the war. A general problem was, being at war, to injure Spanish power wherever possible as a means of forcing peace, the basis of which must be the evacuation of Cuba. The occupation of the Philippines and of Porto Rico were corollaries, so to speak, to our naval successes in the eastern and western seas.

The isolation of Cuba, involving such command of the sea as would entirely prevent any communication of Spain with the island, and enable an army to be landed without fear of danger to its communication, became the Navy's first duty. This made the enemy's fleet the first real objective.

The strategy depended, not upon the actual state of the Spanish fleet, but upon its supposed naval efficiency, and in this respect it was, even in the view of some home critics whose opinion had weight, equal to our own or even superior. Spain had presumably 8 armored ships against our 10, with 6 torpedo-boat destroyers, of which we had none, and 12 torpedo boats against our 6. Her fine armored cruisers (counting the *Carlos V*, which the Spanish minister of marine always counted) made a homogeneous squadron of very high speed, with which in such respect we had nothing to compete.

Spain could do either of three things: (1) Hold all her force on her own coast and act purely on the defensive. This, besides giving up the game in Cuba, would have made attack in her own waters inevitable. (2) Her fast squadron could have made a descent upon our coast. These cruisers, carrying 1,100 tons of coal and accompanied by the destroyers, could, after making the 3,100 or 3,000 miles from Cadiz or the Canaries, have arrived off New York with 1,200 to 1,400 miles steaming left. But with this they could do nothing. They would have to have colliers accompany them from which to coal at some point on our own coast; or they would have to go at once to Halifax and demand coal sufficient to carry them to the nearest home port. In the first case they could have chosen any one of many points from Montauk Point eastward, and if left unmolested two days, could, with three colliers, have taken coal enough with what they had aboard to go to Havana, or if all our fighting force was off Havana, to reappear off our ports ready for action. But such a raid could have effected nothing on our coast from a military point of view, however important politically. To have weight in a military situation a squadron must be able to establish a base and to hold to it, with

the expectancy of fighting a pitched battle to determine naval supremacy. This the Spanish squadron could not do, as whatever the result of an action with an American force of sufficient weight to give battle, such injuries would have to be presumed that after action and with no reinforcements to fall back upon the final superiority was bound to rest with the Americans. But the appearance of the squadron, its coaling and departure, even without an action and its entrance into Havana would have had an effect which is hardly calculable. That it would have had an important political bearing upon the attitude of some of the continental powers is hardly to be doubted.

Such a raid was therefore much to be feared on account of its naval effect, and thus while the main body of our force was held at Key West the flying squadron was formed, and wisely formed, to meet such an emergency. Its ships, with the *San Francisco*, the five of the *Dixie* class of converted cruisers, and the ram *Katahdin*, were quite sufficient, in spite of the vulnerability of many of them, to give battle to the Spanish with a good chance of success, even supposing the *Carlos V* present.

"I am thus convinced that even under the most favoring conditions the Spanish squadron, had it approached our coast, would have been able only to show itself and depart, and the effect, as already said, would have been of sentimental and not of military weight. But the probable effect of such a sentiment made this, to my mind, Spain's best course of action."

The supposed need of defense of the Newport News shipyard and the unprepared condition of Fort Monroe were elements in selecting Hampton Roads as a station for this squadron, where it was thus called upon to play a rôle for which ships are not intended, viz, interior defense. It would be impossible, however, for heavy ships to have gone to Newport News without pilots or aids to navigation, so that danger to the shipyard is regarded as illusory, and the mere occupancy of the mouth of the Chesapeake would mean nothing unless we had completely lost control of the sea. It would amount only to a temporary sea blockade of Baltimore and Norfolk, unless we had lost all defensive energy. The true place for the flying squadron was thus the eastern end of Long Island Sound.

The lecturer says:

"It is a question, however, whether it was not held north longer than it should have been. The action of the Spanish squadron immediately preceding the outbreak of hostilities seemed so clearly to make the Antilles their first objective, and

we knew so much more of the squadron's composition and resources by May 1, that I think the flying squadron should have gone off Havana at once upon the movement of Sampson eastward to Porto Rico. But had we known the density of Spanish ignorance, not only of our own coasts but of their own possessions, we should have been less anxious. The Spanish minister of marine, writing to Admiral Cervera, February 15, 1898, after saying the *Carlos V* and the *Pelayo* were to join his squadron, says: 'As to the war with the United States, I will tell you my ideas about it. A division composed of the *Numancia*, *Victoria*, *Alfonso XIII* (or *Lepanto*), the destroyers *Audaz*, *Osado*, and *Proserpino*, and 3 torpedo boats would remain in Spain in the vicinity of Cadiz. In Cuba the *Carlos V*, *Pelayo*, *Colon*, *Vizcaya*, *Oquendo*, *Maria Teresa*, 3 destroyers and 3 torpedo boats, in conjunction with the 8 larger vessels of the Havana Navy-Yard, would take up a position to cover the channels between the Gulf of Mexico and the Atlantic and try to destroy Key West, where the United States has established its principal base of provisions, ammunition, and coal.

"'If we succeed in this, and the season is favorable, the blockade could be extended to the Atlantic coast, so as to cut off communication and commerce with Europe—all of this subject to the contingencies which may arise from your becoming engaged in battles in which it will be decided who is to hold the empire of the sea. For your guidance in these matters you are acquainted with the preliminary plans of the staff of this ministry, which I place at your disposal, including the attack upon Key West. I will advise you as to the location of the United States ships and other data for which you ask. I will also inform you that 12 or 15 steamers will be equipped for auxiliaries to the fleet, independent of privateering, and, in confidence, will tell you that if any ship of real power can be found, either cruiser or battle ship, we shall buy it, provided it can be ready by April.' I will here state that I never thought Key West in the slightest danger. The distance of the port from deep water and the intricacy of navigation are a protection against any fleet, so long as the place has any defense at all.

"It is difficult to appreciate the naive character of the Spanish minister's views, which were, of course, his inmost thoughts, as they are given by him in a confidential letter to Admiral Cervera. We here see him adding to his force in Cuba the *Pelayo*, which was not yet ready, and with her small coal endurance would have had the utmost difficulty in crossing the Atlantic in any case, and the *Carlos V*, which he ought to have known, as it turned out, would not be ready. Besides these two pieces of astonishing ignorance, his ideas of what he was to do after arrival in Cuba were of the vaguest. In fact, it is difficult for the concrete Anglo-Saxon mind to comprehend the airiness and thinness of Spanish thought. It is always afloat, and never, so to speak, on terra firma. The Spaniards simplified everything by coming to the West Indies direct. Had they gone to the Philippines, as once proposed, it would have been yielding at once the base of contention and have left the Peninsula open to attack. Such a course would have been folly; nor could the writer agree with Mr. Wilson, in his *Downfall of Spain*, that it might have been well to try and head off the *Oregon*; the chance of meeting was too remote. The fact that a westward movement was intended was made clear early by the movements of the Spanish

torpedo flotilla, in which the three torpedo boats broke down and finally had to return to Spain. The *Vizcaya* and *Oquendo* had gone to Porto Rico to meet there, but finally were ordered to join Cervera at the Cape Verdes, which they did April 19.

"Sampson, before the declaration of war, had strongly considered moving east with his heavier ships and, upon a declaration of war, capturing San Juan, which stands an advance post in the Atlantic and but 1,400 miles from New York. It was very important that it should not be used as a base for a coast raid, as once there, recoaled and overhauled, cruisers could have appeared upon our coast and have gone thence to Havana without recoaling? It was the best course from the standpoint of the time and would undoubtedly have been successful. It would have given the war an entirely different phase, as the Spanish squadron would then never have crossed the Atlantic. The discussion of immediate attack upon the Havana batteries at 800 yards is well known. Admiral Sampson was very eager for this and the writer believes he was right and that it would have met with thorough success.

"The move eastward to San Juan was based upon considerations just mentioned. It was reckoned that if the Spanish squadron moved at economic speed we should be able to reach San Juan by the time it arrived there or in its longitude, and that if not found at San Juan we should be able to return to Havana in time to cover that port before they should arrive there. In case they came at a higher rate of speed they would be obliged to coal at some point before reaching Havana, which would likewise give time, after looking in on San Juan and not finding them, to return to Havana.

"It is 2,400 miles from the Cape Verdes to San Juan, and 980 thence to Havana; in round numbers 3,500 miles from the Cape Verdes to the latter point, a distance easily enough made, starting with a full coal supply of 1,100 tons (1,050 being the usual capacity), and at a speed of 10 knots, in fifteen days, or, meeting no obstacle, by the 14th of May. If a higher speed, of 12 knots, were attempted, there would probably be an expenditure of 80 tons per day, or between 900 and 1,000 tons in the voyage, leaving entirely too little in the bunkers with which to meet an enemy with a possibility of defeat. Recoaling before reaching Havana under such circumstances was a necessity, so that in any case the squadron could not be expected off Havana before the 14th, as mentioned. I may say that the expenditure of 80 tons at 12 knots is not overstated, as the *Colon's* log shows that she burned that much at this speed.

"The Admiral asked that the *Massachusetts* and the *Texas* be sent to meet him to leeward of Tortuga Island May 6. A telegram was received, 'It is considered undesirable to detach the *Massachusetts* and the *Texas* at present. Army movement contemplated. Details not settled.' Another was received, 'Large army movement can not take place two weeks, and small movement will not take place until after we know whereabouts four Spanish armored vessels, three destroyers. If objective San Juan, Porto Rico, they should arrive about May 8, and action immediately against them and against San Juan is authorized. In this case flying squadron will reenforce you.' Here, I think, a mistake was made. The truer strategy, as I have previously said, would, in my opinion, have been to move the flying squadron off Havana during the advance of Sampson's squadron east. The situation would then have been thoroughly covered.

“The apprehension of a direct diversion on our coast was, in the circumstances of the period, an apprehension only, and one to be disregarded. It was of high importance that Cervera should not be enabled to use San Juan as a base for this threatened action later, and it was of importance that he should not be able to enter Havana without an action. The movement indicated—i. e., of placing the flying squadron off Havana—would have covered both points. It was very apparent before reaching the Windward Passage that we were not to reach San Juan by the 8th, and there was an anxious turning over of the case in the Admiral’s mind. He carefully weighed the possibilities and results of the Spanish squadron passing him by, but Sampson has the temerity and the intuition of genius, which latter convinced him that San Juan was the enemy’s objective, and in this he was right. The real misfortune was that we had not been two days slower, in which case the battle of Santiago would have been the battle of San Juan and the war would have ended in May instead of in August. We now know that Cervera’s orders were to proceed to San Juan; that he arrived off Martinique the 12th, the date of Sampson’s arrival at San Juan, and that the presence of the latter at San Juan diverted him to Curaçao and Santiago. It is but a run of 375 miles from Martinique to San Juan, and the 14th would certainly have found him there but for Sampson’s previous arrival. * * *

“Cervera left Curaçao the evening of May 15, and arrived at Santiago at 8 a. m. of the 19th. They had received only about 400 tons of coal at Curaçao. * * *

“Admiral Sampson is the only person I know of who guessed Santiago. This appears in a telegram to the *Harvard*, May 16, where he telegraphs the fact of the Spanish squadron’s being at Curaçao and says: ‘Destination unknown; probably Santiago de Cuba or San Juan, Porto Rico.’ By the evening of the 20th, however, we had definite news of their being at Santiago. Commodore Schley was at once directed there, and Sampson moved into Nicholas Channel with a fleet of such a heterogeneous character that it was denominated by the men the ‘Bargain-counter Squadron.’ But it was the best we could do, and by gradual accretions it became a powerful force, well able to meet Cervera if he would stand and fight, but the *New York*, *New Orleans*, and the *Mayflower* were the only ships with speed. Cervera would have had no difficulty in escaping a general action, had he so desired. It may be that the move into Nicholas Channel was a mistake; that it would have been better to remain close off Havana, but it was thought that if Cervera started toward Havana he would certainly choose Bahama Channel, knowing the Flying Squadron to be on the south side in a position to intercept him. Admiral Sampson was sure in his own mind until the arrival of the *Dolphin* with dispatches brought from Cienfuegos by the *Hornet*, at 9.30 p. m. of the 26th, that the flying squadron was off Santiago by the 24th. The news that this was not so caused his going to Key West and finally to Santiago with the *New York*. In Nicholas Channel he picked up the *Mayflower*, *Porter*, and *Oregon*, which last had arrived at Key West on May 26, and coaled and joined the squadron in Nicholas Channel on the 29th. On June 1 a close blockade of Santiago began.

“There is one very remarkable occurrence on the part of the Spaniards to be noted. On the 24th of May a council was convened on board the flagship *Maria Teresa* to discuss the proposition to leave Santiago and go to San Juan. It was decided not to do so chiefly on the grounds that they had a small coal supply aboard;

that the ships would have to leave the harbor one by one at slow speed; that the certain danger to the squadron was much greater than the few advantages which might be derived from reaching San Juan; that the *Colon* might be injured in going over a rock at the entrance, over which there was but 8 feet of water between the rock and the *Colon's* keel; that therefore it was necessary to abandon the plan, remain at Santiago, refit as far as possible, and take advantage of the first opportunity to leave the harbor, 'at present blockaded by superior forces.'

"This shows the effect of imagination; of making pictures of things which do not exist. The fact is the only ships we then had near the port were the *Yale* and the *Harvard*. Commodore Schley's squadron had not yet left Cienfuegos, or only left there the evening of that day. There was absolutely nothing to prevent the exit of Cervera's squadron until the evening of the 28th, as it was not until then that the Flying Squadron was within less than 20 miles of Santiago. Two days after the decision just mentioned—i. e., on the 26th—it was as unanimously decided to go to San Juan, and orders were given to spread fires and be ready by 5 p. m. But Cervera had to call another council, and the fear of the *Colon's* striking (though the two officers upon whose opinion he most depended, Bustamente and Concas, favored going) prevented again, and they stayed to certain doom. The fact seems to be that Cervera had made up his mind that there was no escape for him in any event. He had allowed himself to fall into a state of gloomy foreboding which made action of any kind impossible to him. He had either lost the faculty of command or had lost all confidence in his captains. On the 26th, according to Captain Concas, the *Maria Teresa* had 300 tons of coal, the *Oquendo* and *Viscaya* 500 each, and the *Colon* 700. Had they left in the evening they would probably have had an uninterrupted week at San Juan, as our people, in case they would have been unable to dog their movements, would have supposed them to have gone to Cienfuegos or Havana. I do not think it possible that San Juan would have been the objective guessed at. But unless they had been able to coal there they would have been presumably in a worse state than at Santiago, as the anchorage of San Juan is largely open to gun fire. A better course would have been to go to, say, the Gulf of Maracaibo, prearranging a meeting with their colliers, of which they still had two within call in the West Indies. But their true course was to endeavor to reach Havana, and this they could have done by the westward. The squadron had a sustained speed well above that of the Flying Squadron, even had the latter sighted them, which was very unlikely from their position more than 20 miles S.S.E. of Santiago at 8 p. m. of that date. Cervera's squadron being where it was and where it never should have been, and in so desperate a situation, his only course was a bold dash for a port where his presence would really have told. No greater harm could possibly have come to him than was bound to come where he was, and whatever the final outcome, he might have given us much trouble by going into Havana. But the Spaniards seemed incapable of thought. Utter incapacity ruled every movement; they were 'gallied,' so to speak, out of their minds."

The absolute absence of Spanish plans is noted:

"The sinking of the *Merrimac* is regarded as a good tactical move. The Santiago channel is less than 200 feet in parts, and a proper placing of the ship would have

made the Spanish squadron hors de combat as much as if they had been (as an American paper once reported one of our own ships) docked in Madrid.

“A reference to the council at the ministry of marine April 23 will show this: Their trans-Atlantic voyage was handled, as badly as possible; there should have been every effort at concealment, and they should have gone secretly to some point where they could have coaled and overhauled machinery before going on to the Cuban coast.

“The formation of a powerful squadron for the East and a covering squadron to accompany them into the Mediterranean, along with the result of the battle of Santiago, caused the return of Camara's squadron, which had left Spain for the Philippines. It was a thoroughly abortive movement. It is regarded fortunate, considering European susceptibilities, that we were not called upon to send any force across the Atlantic.”

In another lecture Captain Chadwick dwelt on the Spanish-American diplomacy of the century.

He showed the interlacing of events in Spain in the earlier part of the century with the developments of the Cuban difficulties; the invasion of Spain by Napoleon; the consequent formation of numerous juntas, and finally a central junta which governed despotically and brought about the movement for independence in South America and Mexico, a movement which thus had its beginning in Spain and not in America; the formation of a constitution in 1812; the overthrow of this in 1814 by Ferdinand VII on his return to Spain from his detention in France, and his reestablishment of absolutism; Spanish anarchy and revolution of 1820, when the constitution was reestablished for three years; the action of the Holy Alliance (England excepted) in determining upon an invasion of Spain in 1823 by a French army, for the purpose of the abolition of the constitution, and the reestablishment of despotism; the determination of the alliance to attempt to bring back the Spanish American provinces to Spanish subjection; the proposition from Mr. Canning to Mr. Rush, our minister in London, to take action estopping this action by the Alliance, the outcome of which was the declaration of the Monroe doctrine; the fear of our statesmen of the taking over of Cuba by England; the opposition of the Southern members in Congress to the Panama Congress through fear of a pan-American agreement which would result in the freeing of Cuba through the combined action of Mexico and the United States of Colombia; the determination on the part of the South and by our Government that Cuba should remain Spanish with slavery rather than be free with negro freedom; the establishment of absolutism in Cuba, in the person of the captain-general in 1825; Cuban discontent

on account of the entire ignoring of the creoles in governmental posts and influence; the continual fear of England's seizing Cuba; the effort to buy in 1848; the era of filibustering and of desire on the part of the United States to annex Cuba as an extension of slave territory; the affair of the *Black Warrior* in 1853, which nearly caused war; the diplomacy of the Pierce Administration; continued effort to purchase Cuba, and the meeting of our ministers to London, Paris, and Madrid under orders of the President, which resulted in the report known as the Ostend manifesto, which advocated the seizure of Cuba if Spain would not sell; Spain's rejection of any offer; Buchanan's continued effort to bring about annexation; change in American opinion on account of the slavery question; decrease of American political interest in Cuba until the insurrection of 1868-1878; the affair of the *Virginius*; the disregard of the Spanish-Cuban authorities of treaty stipulations in their slaughter, without proper trial, of fifty-two of the crew; our denial of their right to seize a ship with an American register on the high seas under the circumstances, even though her register had been obtained fraudulently; the demand for her delivery and release of the remainder of her personnel, with money amend, which was complied with; the warlike attitude of the United States; the orders to the American minister to close the legation and leave Madrid if demands were not acceded to by a certain date; the yielding of the Spanish authorities on the date set; the protests of our Government against the Spanish method of warfare in Cuba; the circular letter of Secretary Fish sent with endeavors to bring about such concert of action as would cause pressure upon Spain to bring the Cuban insurrection to an end, making reasonable concessions to Cuba; the failure of the attempt; letter of Mr. Cushing, our minister in Madrid, saying that Cubans and Spaniards were merely alike; that the Spaniards only did in Cuba what they did in Spain, and that the whole difficulty was to be laid at the door of national temperament; the message of President Grant stating the position of our Government with reference to Cuban belligerency, which is a classic on the question, and marking the end of our more serious antebellum diplomacy with Spain.

The lectures on International Law delivered during the summer consisted of a series of ten general lectures by Captain C. H. Stockton, U. S. N.; two special lectures on the subject of Insurgency, by Professor George G. Wilson, of Brown University; and

one on the Monroe doctrine, by Professor Albert Bushnell Hart, of Harvard University.

The subjects of the general course of lectures on International Law were as follows:

1. Introductory; Historical Sketch; Sources; Sovereign States as Subjects of International Law.
2. Territorial Property of a State; Territorial Jurisdiction of a State.
3. Nationality; Protection to Citizens Abroad; International Agents of the State; Treaties; Forcible Steps Short of War; General Questions as to War.
4. Declaration of War; Effect of War as to Persons; Effect of War as to Property; The Laws of War with regard to Persons.
5. Effect of Laws of War as to Things and Property; Military Occupation and Government; Maritime War; Right of Search; Trade with the Enemy.
6. Commercial Domicil; Merchandise in Transit upon the Sea; Devastation; Capitulation; Armistice and Termination of War.
7. Neutrality; Rights and Duties of Neutrals; Belligerent Acts are not permissible in Neutral Territory.
8. Hostile Expeditions from Neutral Territory; Loans of Money to Belligerents; Aid to Insurgents; Contraband of War.
9. Unneutral Service; Blockade.
10. Continuous Voyages; The Declaration of Paris; Capture and Condemnation of Merchant Vessels; Transfer of Flag.

Captain Asa Walker gave several lectures. In one on Previous Naval Operations in the North Pacific, he gave an abstract of previous wars, dwelling mainly on the Chinese-Japanese of 1894:

“* * * From the virtual opening of hostilities on July 25, 1894, up to the battle of the Yalu on September 17, there seems to have been little desire on the part of either belligerent to bring about a fleet action. The paramount necessity on the part of Japan of protecting the transit and landing of the vast expeditionary forces to be engaged in its land operations would account for the employment of its naval forces in securing this end, and such evidently was the plan of the Government. The detached squadrons cruising in the Yellow Sea and the Gulf of Pechili acted somewhat in the capacity of scouts, to discover the movements of the Chinese naval forces, to give timely notice of operations toward Korea, and not to engage in an active campaign. The wisdom of this course seems to have been fully established by subsequent events. With the army landed, complete in outfit and supplies, and uninterrupted in communications, the navy was left with a free hand to accomplish its share of the fighting. That the sea campaign might have been pressed at least a month earlier on the part of Japan, had the intention and movements of the Chinese fleet been known, is no doubt true; but Japan, with wisdom, acted upon the principle ‘It is better to be safe than sorry,’ and made sure that when the arbitrament of battle was entered into, she would risk the least possible. A defeat to her navy in the

early part of the war would have been a far more serious blow to her power than it would have been at the date when battle was joined. * * *

“* * * During the entire war, the sole honor and credit that attached to the Chinese arms was due to its naval forces. Admiral Ting, either of his own accord, or acting under the influence of his European advisers, seems to have had some slight idea of minor strategy and tactics, and exhibited throughout a degree of gallantry that was utterly lacking in any of the commanders on shore.

“Had his desires with reference to the destruction of the fortifications on the mainland at Wei-hai-wei been carried into effect, though probably in the end the result would have been the same, the Japanese would have found a far more difficult problem to solve. The Chinese navy deserves the greatest credit for the prolonged resistance it made in every encounter. * * *”

In a lecture on the battle of Manila, a most valuable contribution to the literature of the subject, the lecturer says:

“* * * The quality of the campaign depends not so much on the marvelous success of May 1, to which history furnishes no parallel, as upon the conception and execution of the plan by which such results were made possible. The deliberate formulation of a method of procedure, wherein each and every pro and con had been weighed and assigned its value, shows that Commodore Dewey, under his quiet exterior, concealed the genius that inspires the leader. He had self-confidence and what, perhaps, was as valuable, confidence in those under his command. He himself was ready to put forth his utmost endeavor to accomplish the end in view, and felt assured that all those under his command were animated by the same spirit. All his preparations were sound in principle and fact; the blow he struck was not faint and faltering; there was nothing tentative in his knocking at the door of Manila; he did not parley about admission, but, using his whole power, forced entrance over the ruins of the opposing force. * * *

“* * * Perhaps the main lesson to be learned from this battle is the necessity of thorough preparedness in every available direction. Captain Mahan has defined ‘presence of mind’ as ‘preparedness of mind from previous considerations of the subject.’ Such previous consideration of the problem gave to Commodore Dewey the presence of mind to take advantage of all favorable points in the campaign and to use them so as to best advance the end he had in view. * * *”

In discussing the question of Naval Preparation for War in Time of Peace the lecturer dwells at some length on the details of a naval reserve force.

He reviewed the experience of the late war to bring forward the fact that auxiliary ships needed for a squadron in foreign service in time of war should be ready for use at its outbreak, and not bought and fitted after hostilities had commenced:

“* * * A résumé of the list of non-war vessels that should be built and kept on hand by the Government, as a part of its permanent fleet, is, then, as follows:

"Fast colliers, in number sufficient to be able to furnish at least one full coaling to every ship of the fleet.

"One *Vulcan* for each squadron.

"One *Solace* for each squadron.

"One distilling ship for each squadron.

"One depot ship for each squadron."

Special attention was directed to the necessity of having vessels of our merchant marine built in such a way as to minimize the changes necessary to fit them for war service. The plans of the ship should be kept in the Navy Department, and if intended for use as a cruiser, the battery and ordnance outfit should be held in store.

The college regards this precaution as most important; and believes that in all cases in which the Government pays any bounty or subsidy to a steamer, it should be conditional on the construction of the ship on plans approved by the Navy Department, and on her constant maintainance in condition for war service.

The lecturer dwelt on the organization of a national naval reserve, and on the establishment of coaling stations:

"* * * In the establishment of coaling and supply stations without the limits of our continental possessions, the demand that these stations be securely protected from seizure by the enemy is even more imperative than it is in respect to those located within our own borders. In the latter case, the loss of such a station could be summed up at so many dollars and cents, and such and such loss of local prestige. The capture or destruction of even one of the outlying stations might mean the total miscarriage of a campaign and the putting out of action of a whole fleet. If such depots are established for the purposes of both peace and war, they should be put, from the start, on a war footing, and so fortified as to be secure against seizure by any probable expedition of an enemy. Unprotected, they are standing invitations to a hostile fleet to enter and help itself to the sinews of war, as free gifts from its opponent. * * *"

Concerning reserve ordnance equipment the lecturer says:

"* * * Provision, by proper appropriation, should be made for the construction of a reserve supply of the latest pattern of modern guns, outside of those set apart for the auxiliary vessels as before mentioned. Local auxiliaries, improvised torpedo-boat destroyers, and harbor scouts, all would require armament. The policy of constructing only the guns necessary to arm the war vessels under construction or authorized by Congress forces the country, in time of need, to depend upon the world's markets. If the need be recognized early enough and there be no competing bidder, the demand may, possibly, be partially supplied by a job lot collected, as it were, from the junk shops of Europe. The diversity of types of guns, and of ammunition for their service, are sure to produce more or less demoralization to the personnel. If, however, the enemy is prompt in the declaration of war, the trade in such material will be somewhat hampered and the delivery of the

needed goods becomes a subject of doubt. Unless it can be surely determined that we are never to be at war with a sea power, such a reserve supply of naval guns is a most wise provision to be made now, while peace prevails. * * *

In closing:

“* * * The reliance placed by the general public on the genius of the people to meet and overcome the emergencies of war is unreasonable and delusive. The fact is lost sight of that it takes months to build a heavy gun and years to construct a ship to carry it into action. The conception of a brilliant mechanical idea and its visible realization are separated by a space of time, every instant of which may be of vital importance to the country's welfare. It is admitted that Providence has blessed our nation with a fair share of brains, but not a monopoly of that outfit. Ideas in reference to war machines are of value in actual service only when presented in material form. Instead of relying for success in war upon schemes ventilated at the instant of need, we should strive to keep our fleets up to a respectable comparative standard of efficiency, with the appliances recognized by the world as demanded, and improve thereon to the best of our ability. A single battle ship, constructed and armed according to the present world's standard, and in commission, is of far more service in war than any fighting machine that exists only in the mind of the most gifted inventor. * * *

In a lecture on Coast Defense and Attack, Captain Walker discussed the question of attack by ships on fixed fortifications:

“* * * The gun stands behind a defensive barrier composed of earth, stone, or steel, into whose construction the element of weight did not enter. Its foundations are the solid earth; its thickness such that no shot from any gun can penetrate, and its height sufficient to protect everything but the gun itself. The gun alone is vulnerable—a hit, to count, must be on the gun itself.

“In a conflict between the battle ship and the fixed fortifications, the initiative must be with the former; the movable must approach the fixed. The conditions governing the range, area of target, vulnerability, and protection of personnel differ widely between the two forces. On board the ship, even the best range finder affords but a rough estimate of the distance of the object to be fired at; the area of the target that must be hit, to inflict injury, seems but a pin point to the distant gunner. A hit two feet to the right or left or the same distance up or down from the center, means a wasted shot. Bull's-eyes are the only shots that count on this target. Since penetration is impossible through the immense walls that protect the personnel, there appear but two ways by which the attacking vessel can inflict injury on its adversary: Either to engage at such close range that hits on the gun may surely be made; or to enter into a long-distance duel in which its shells, with the angle of fire due to such distance, may enter the inclosure of the fortification, and by their impact and explosion work chance havoc. In the one case, the ship is exposed to almost certain destruction; in the other, while comparatively safe, its fire may cause annoyance, though probably little serious damage. Any success scored must be classed as a luck hit, and not due to skill and courage.

“All is different with the soldier in the battery. With his perfect range finder he knows, from moment to moment, the exact distances of his enemy. He has before

him a target 300 feet in length and 30 in height, on any part of which a shot will inflict damage. He also has the knowledge that, should his enemy approach within a fixed distance, the armor that hitherto has shielded the vitals will reach its limit of resistance, becoming useless for protection and a factor for destruction. * * *

"* * * The guns in the fixed fortification are not the only instruments of destruction in the hands of its garrison. Extending seaward in the navigable channels are planted mine fields, electrically controlled, whose exact positions are known to the expert having them in charge. Any vessel that may have escaped vital injury from the Scylla of gun fire, risks falling into this Charybdis of mines, in which he may be totally destroyed. Weathering these two dangers, if the entrance be narrow, he meets attack from the automobile torpedo fired from shore-mounted torpedo tubes, or is attacked by the weapons of the torpedo-boat fleet defending the passage. Surviving all these assaults, the ships enter the hostile harbor and pass out of range of the batteries. They are now units of strength whose influence can extend only from the shore to the limit of effective gun fire; their powers for destruction are great, but they can hold little or nothing for their own use. The batteries they have passed are still un-reduced—and un-reducible by their fire. Though in one sense victors, they yet are prisoners who, to escape, must again pass through the fields of gun fire, mines, and torpedoes. Unassisted by land forces, which can occupy and hold the territory swept by their gun fire, the invading fleet can have but a local influence on a campaign.

"In former wars it has been demonstrated that fleets can run by fixed fortifications, while powerless to silence them. Is such the case at the present day? With broad, open, deep, and unobstructed channels, it is probable that ships could pass with a large element of safety; but where the channel is narrow and tortuous, with all guiding marks to navigation removed, with an alert and fully prepared enemy, would a fleet of modern battle ships venture to force a passage, through mines and torpedoes, past the heavy guns of batteries? Surely it would be most hazardous during daylight, and scarcely less so in fog or darkness. Would the success to be gained be adequate to the risks run?

"It must be remembered, and full value given to the fact, that battle ships can not be recruited from the public, either to swell the number to be employed or to replace those which may be lost in action. A battle ship destroyed means a vacancy in the fleet not to be filled during the probable period of the war. However great may be the constructive ability of our people, human hands are incapable of putting human ideas into the form of a modern war vessel, without consideration of the time interval. It may be possible to build a battle ship in a single year, but hitherto it has taken at least two years, and more often three or four. The *Kearsarge*, our latest battle ship just commissioned, has been under construction for four years. * * *"

In illustrating the impossibility of establishing any absolute measurement of the efficiency of a fleet in time of war, the lecturer says:

"* * * In obtaining and holding the command of the sea, either to prevent invasion or to cover a counter invasion, the fleet is paramount, and only the total destruction of an enemy's sea force could eliminate it as a factor from the contest.

Its value and duties, outside of its conflicts afloat, are to be measured, not so much by the actual deeds accomplished, as by its prevention of hostile expeditions and its protection to its national forces. Without the firing of a hostile gun, a fleet may assure the successful landing of a force on an enemy's shores, whose operations may decide the campaign. This same fleet, by the exercise of its utmost force in an attack on an enemy's fixed fortifications, might—nay, probably would—be driven off with loss and in no way influence the results of the war. * * *

If there is a land force that can act with the fleet, the fixed fortifications may become useless.

“* * * It would seem to be an accepted fact, that well-constructed fixed fortifications, loyally defended, can not be reduced by gun fire from a fleet. A strict land-and-sea blockade must, in time, bring about the surrender of a beleaguered fortress, however powerful its ordnance or numerous its garrison, for the time must come in which its supplies will be exhausted. If the fixed fortification be so located that its line of communication with the interior of the country is liable to interruption and a land blockade become possible, much of its usefulness is lost. It becomes an outpost, temporarily self-supporting, but, unless relieved, sure to fall. It would seem reasonable to expect that fixed fortifications, while closing the front entrance to a port, should have defenses looking to the protection of that port from its landward side, and especially should this be the case where the natural configuration of the coast is such as to permit the safe and easy landing of a hostile force under the guns of a protecting fleet. * * *

The last proposition was emphasized by the lecturer by suggesting methods in which some of our fortified harbors could be easily reduced if the enemy had an adequate land force.

The College agrees with Captain Walker in general in his statement of the impracticability of attempting to reduce permanent fortifications by a fleet. Exceptions may arise, however; and other good purposes may also be served by bombardments, as was unquestionably the case at Santiago in 1898.

On the important subject of Convoy and Transports, Captain Walker drew attention to the fact that we are absolutely without modern precedents to guide us in deciding on convoy tactics:

“* * * While the subject of fleet formation for battle is in its present argumentative condition it were mere presumption to formulate any positive scheme or plan for convoy formation, which of itself must include the battle problem—at least, one can but present questions and await answers. It seems evident that the formation of the convoy should possess the twofold qualification of being such as is liable to the least derangement, and also such as will admit of the readiest protection. To combine these two requisites, each in the highest degree possible, should be the aim. It is certain that the convoy must be kept in some regular formation easily adopted and mobile in character. Unquestionably the single column formation is the simplest of all, but its adoption in a large convoy would string the fleet out over so

many miles that the units of the convoying fleet would be hampered in supporting each other. Hence, it would seem better to form multiple columns, which, while more complex, present shorter lines for concentrated defense. For example, a convoy of thirty vessels in single column, with two cables' length distance, would be nearly 6 miles in length, while in double column it would be but half as long, far more compact, hardly less mobile, and capable of better defense. * * *

"* * * The escort should be composed of battle ships, armored cruisers, and fast cruisers of sufficient size to keep company in all weathers with the convoy. Of these vessels the fast cruisers should be stationed on the flanks, in advance and in rear of the convoy, at extreme signal distance by day, closing in at night or in thick weather. The battle ships and armored cruisers could well be disposed in parallel column on either flank of the convoy.

"With this disposition of forces the fast cruisers could give timely warning of the approach of the enemy, the escort could readily assume the formation necessary to meet an attack, and the convoy could be maneuvered in the most protective position.

"The importance of keeping the vessels of the escort within supporting distance of each other must be clear to all. To break up the escort into separate squadrons with stations distant from one another would seem to invite defeat in detail and the loss of the whole expedition. Unless the escorting fleet has a force at least equal to that of an attacking enemy it would seem a foregone conclusion that disaster must result to the convoy. By the division of a superior force into squadrons attack would be invited. * * *

"* * * In the formulation for the plans for the formation, conduct, and evolutions of a convoy and its escort it is far easier to adopt the style of the Decalogue, 'Thou shalt not' than to unreservedly enunciate 'Thou shalt.' Thus, we may say: The formation of the fleet must not be complex; the escort must not be widely dispersed; the enemy must not be permitted access to the body of the convoy; the convoy must not be allowed to straggle; etc. But how these numerous 'nots' may be eliminated is another far more difficult problem. * * *"

In discussing the defense of a convoy against actual attack:

"* * * Other things being equal, the victory would necessarily be with the stronger force, and it would therefore seem a hazardous task to undertake such a convoy unless the convoying fleet outclassed any force that could be sent against it. The sole hope of safety would otherwise lie in evasion. At the present day it would be almost impossible to conceal the departure of such a convoy from its home port, yet though its track across the ocean would be a matter of conjecture, circumstances might unerringly point to its proposed haven, near which it might be waited for by the belligerent fleet. * * *

"* * * Disaster to the convoy, as has already been said, must follow when attack is made by superior force, but the degree of injury arising from attacks by inferior force must remain a matter of conjecture. It may confidently be predicted that the operations of the inferior force will be made at night, involving a large element of chance and desperation on either side. * * * No doubt confusion will exist, but it will not be confined to one fleet. Night attacks as well as night

defenses are apt to miscarry, and although the attack has, perhaps, a moral prestige, an error or misfortune may turn the scale to the side of the defense. This, coupled with the fact that it should be impossible to surprise entirely the convoy, places the adversaries more nearly on the same footing. To what extent the enemy may be ready and willing to jeopardize his vessels to inflict injury upon the convoy will depend upon how vital he deems the success of the expedition to his cause. It is possible to conceive that he may deliberately sacrifice his whole fleet, if by so doing he can work such injury to the convoy as will defeat its object. * * *

“* * * It is beyond the power of fancy to picture the demoralization that would be wrought in a convoy of troops by the operations of a few hostile cruisers or gunboats running amuck through their ranks, themselves, for the time being, in comparative safety, their powers of destruction would be almost unlimited. * * *”

As one of the most vital points in connection with the subject of convoy, the lecturer discusses the question of command:

“* * * I therefore assert that vessels used for the transportation of troops and supplies to or from a dependency should be under the command of a naval officer, with officers and personnel also from the naval branch of the service. While this claim may seem of slight importance as applied to a single ship, it can readily be seen that a multiplication of vessels acting together brings it into great prominence. The unit of a transport fleet, if alone, has but to pursue its assigned course, with what speed it may, subject to the will of its commander. This same unit, when in company with others, must merge its individuality into the mass and become subject, in all matters outside its own hull, to the directions of one deciding mind. These directions are issued to the individual units by means of signals that indicate the evolutions to be performed to arrange the fleet in the formation desired by its commander. To take up these formations various movements must be made which require study and experience. * * *

“* * * We need go back but two years in history to point our moral. The Santiago convoy was composed of ships that doubtless were each individually directed by a capable and efficient navigator skilled in the exercise of his profession, yet it was, as a whole, entirely lacking in cohesion; repulsion rather than attraction was the rule. Each vessel seemed to feel safe only when at extreme distance from its neighbor. Sea room was what each desired, and to obtain it all means were used—increase in speed, decrease in speed, change of course, etc. The convoying vessels were constantly employed as whippers-in, to keep up even a semblance of convoy. * * *

“* * * The absolute necessity for concurrent intelligent action in all the members composing a fleet is so self-evident that it must be apparent to any but the dullest mind. Such action can be insured only by study and practice. On whom, then, does it seem reasonable that the country should depend for the proper and consistent performance of her sea requirements save on those whom she has educated for that purpose? ‘A house divided against itself can not stand.’ A fleet, part of whose units are controlled by naval officers and part by military officers, like ‘a rope of sand,’ possesses neither strength nor flexibility, and is worthless in the hour of trial. * * *”

The college believes that this is the most important matter connected with the subject of convoy, and, unfortunately, it is not yet decided. While our present system may suffice in time of peace, when a transport is largely a passenger steamer, it is not adapted to war. A naval officer ordered to convoy a fleet of transports and to protect them against hostile attack must, in accepting the responsibility, be granted full command over every vessel in the fleet. If this is not granted, he should formally protest. Any amount of personal or official inconvenience should be faced rather than accept conditions imperiling the national safety in war.

Major Paul St. Clair Murphy, U. S. M. C., delivered a lecture upon The Military Features of the Problem. This lecture, while most interesting, is of a confidential nature, and therefore can not be published.

Major D. M. Taylor, Ordnance Department, U. S. A., read an interesting paper on the Great Lakes, dwelling on the importance of maintaining a policy of preparation on that part of our frontier.

As this lecture is for the most part of a confidential nature, no synopsis of it is given in this Abstract.

Major J. G. D. Knight, U. S. A., presented and discussed the subject of Submarine Mines.

As it is admitted that fleets can not silence and destroy forts, they must, to secure an objective behind the forts, run by the latter. To prevent this is the main object of submarine mines.

Mortar fire, rather than mines, is advised to prevent anchoring or the use of an anchorage.

Navigable channels indicate locations of mines; ranges of rapid-fire guns and searchlights determine the extent of the mine field.

Great depths and strong tidal currents are unfavorable to the employment of mines.

A description was given of the American system of mines and the methods of operation.

At what distance from a battle ship is the mine dangerous? This subject is treated both theoretically, in connection with the formulas of Abbot and of Bucknill, and practically, by reference to results of numerous experimental firings. Special attention was directed to the results of the *Oberon* experiments.

Intimately connected with the dangerous zones of mines is the size and nature of the charges of mines. These were given for the American and, as far as known, for English and French mine systems.

The need of vidette boats to assist in guarding mine fields against friend and foe was shown. The beginning of war may be so soon followed by the appearance of a hostile navy, and the planting of mines requires so much time, that the one must be immediately followed or even anticipated by the other. Hence the necessity of a channel for friendly vessels so long as such channel can be safely maintained. To restrict these vessels to the use of this channel when passing through a mine field is an important duty of the vidette boat.

Data as to the effectiveness of the attack by countermining is conflicting. At best it is a method that will require much drill in time of peace to promise favorable results in time of war.

Dirigible torpedoes operated from shore stations have very limited chances of successful operation. While controllable, in that they may be started, stopped, and turned to the right or left or about, they are difficult to direct, once out of a course which is in a vertical plane through target and observer.

Professor P. R. Alger, U. S. N., delivered two interesting lectures, one on Ordnance and Armor and the other on the Effects of Gun Fire at Sea. In the former Professor Alger says:

"No change has been made for many years in either the material or the general method of manufacture of guns.

"Progress, as far as the gun itself is concerned, has been in the direction of greater power and greater rapidity of fire. The first of these has come from better powder and larger powder charges; and the second, primarily, from gradual improvements in the details of breech mechanisms—neither has resulted from any radical change of system.

"The muzzle energy of the new gun is two and a quarter times what the old designs of the same caliber developed with brown powder, and from 60 to 70 per cent greater than that given by the old designs, when they used smokeless powder.

"The new 12-inch gun is as long as the old 13-inch and its muzzle energy is greater, but with its mounting it weighs 19 tons less and its ammunition weighs about 400 pounds less per round. Supposing an allowance of 100 rounds per gun, we have greater armor penetration and a much flatter trajectory on 37 tons less weight.

"The question, then, naturally arises, why not continue further in the same direction?

"There is an important difference between the two cases, however. Flatness of trajectory is equally of value in fighting between ships at sea and between men on shore, on account of the resulting increased danger space. Reduction of weight

per round of ammunition, while most important to the soldier, is still of great advantage on the war vessel. But the one disadvantage of the small caliber, its less destructive effect, tells against it in naval warfare far more than in land fighting. Man is so highly organized an animal that, as a rule, any wound will put him out of action, but a ship may be pierced through and through without having either its offensive or defensive powers materially reduced. In a battle, the more men wounded, however slightly, the sooner is victory won; when a great ship is the object of attack, it is most important that each blow successfully landed shall produce a serious destructive effect. The widespread effects of the large-caliber shell are needed to produce decisive results.

"For a long time I was an advocate of retaining the 13-inch gun for our battle ships. I am now inclined to think that the reduction in caliber to 12-inch is, on the whole, advantageous, but I think it would be going entirely too far to make the 10-inch the largest naval gun.

"Considering next rapidity of fire. The automatic principle, whereby a portion of the energy of each fire is used to reload and fire again, has been extended from the machine-gun caliber to the 6-pounder, and even to the 14-pounder, but the 1-pounder, with its 250 shots a minute, seems to be the limit of its really advantageous employment. As the weight of the ammunition increases, automatic loading becomes too violent for safety and efficiency.

"The semiautomatic system, in which the force of each discharge opens the breech, and at the same time compresses a spring which, when set free by the act of loading the next cartridge, again closes the breech, has a wider range of usefulness. Applied to the 6-pounder this system has given a rate of fire of upward of fifty shots a minute, and although of less value as caliber increases, I predict that its use will be extended to the largest guns. The time required to open and then close the breech of a heavy gun fitted with our usual breech mechanism varies from nine to ten seconds for the 8-inch to upward of fifteen seconds for the 13-inch, and a saving of this time, possible by utilizing the counter-recoil to open and also to store up power for closing the breech, is of considerable importance.

"With the latest 8-inch breech mechanism, devised by Lieutenant Haeseler, opening and closing take only about a second, and the priming is done while the shell and charge are being loaded. The result is that a rate of unaimed fire of nearly six rounds a minute has been attained with the new 8-inch gun at the proving ground. When it comes to aimed fire under service conditions, of course such rapidity is out of the question. One well-aimed round a minute would be very good for the 8-inch gun of present service type, and I should say that equal skill might give pretty nearly two rounds a minute with the new gun and also with the most improved electric training gear. Perhaps it would be safer, however, to count on only a round every forty-five seconds.

"The latest guns of caliber above the 8-inch will also have a slightly less loading interval than the present ones, due to an important improvement in breech mechanisms, which has been applied to all calibers from the 4-inch up, but which has greater and greater advantages as the caliber increases. I refer to the use of a breech plug that has more than half its surface threaded, thus allowing a decrease

in length of screw box, with notable attendant advantages. Of course, if three-fourths of the surface of a plug can be threaded, instead of one-half, the length can be reduced one-third without loss of strength. The result is that some 6 or 7 inches has been removed from the breech end of the 12-inch gun.

"Coming next to the general subject of gun mountings. The most important recent development in this field has been the successful use of electricity for manipulating the heavy guns. Frequent failures of electrical appliances on board ship, and the usual difficulty of quickly locating such failures, made people hesitate to rely entirely on electric power for so important a thing as the operation of the main battery of a battle ship. But better apparatus, resulting from vastly greater experience on the part of the manufacturers of electrical appliances; better installation, resulting from our own greater experience; and, above all, greater knowledge and practical experience on the part of both officers and men, have removed all the serious disadvantages, and in future installation of heavy guns we shall realize the great advantages that flow from the use of electric power.

"At last we have reached the point of ceasing altogether to manufacture brown powder, except for shell charges and saluting; and, while large quantities of brown powder are still on hand and must be expended in target practice, all new ships have a full outfit of smokeless powder, and the old ships are gradually being supplied with it.

"As regards projectiles, I can see but one important step in advance that has been taken in this field within the past few years, and that is the adoption of the cap to increase the effectiveness of armor-piercing shell against hard-faced armor. In my opinion the cap should be used on all shell—not on armor piercers alone. We have adopted, wisely, I think, the plan of making our common or explosive shell of forged steel, having some armor-piercing qualities, sacrificing size of explosive charge for the purpose of extending its field of effectiveness to cover the thinly armored portions of an enemy. Such shell would certainly be made still more efficient if capped, and the cost of capping is so small as to fully warrant its being made universal for shell of 4-inch caliber and above.

"As far as high-explosive shell are concerned, I see little to warrant their use. To get good effect, a high-explosive shell requires a fulminate detonator to be associated with it. Such shell are vastly more dangerous to use; and, in my opinion, but little, if at all, more effective than powder-loaded shell. For use with high-angle fire from shore batteries, the high-explosive shell of large capacity may serve a useful purpose. We have, then, four classes of projectiles: Armor-piercing shell, for use against armor; common shell, for use against unarmored, or very thinly armored parts; shrapnel, for use against exposed bodies of men at a distance; and cannister, for use against exposed bodies of men at close range.

"Which of the first two classes would better be used in a naval action, of course, depends upon the type of our opponent; if unarmored, common shell alone should be used, with the proviso, that what we generally called the armor-piercing shell of the minor caliber rapid-fire guns is really only steel, common steel, and should be used even against torpedo boats as the small cast-iron shell breaks up on very thin plating. If armored, the question what kind of shell to use becomes more

difficult, considering that either the 10, 12, or 13 inch forged steel common shell will carry its bursting charge through at least 6 inches of hard-faced armor, it is seen that by the use of such shell, instead of armor-piercing shell, we add greatly to the destructive effect of a hit anywhere except on the very small area which is covered by thick armor, while, on the other hand, we reduce to zero the effect of a hit on the thick armor. This seems to me to indicate the desirability of using both classes of shell from the heaviest guns, either firing them alternately or using the common shell in the earlier part of the action and later on, when range is shorter and the enemy's secondary battery has presumably been wholly or partly disabled, using armor-piercing shell. As for the 4, 5, or 6 inch guns, if we use common shell from them, we restrict their area of destructive effect to the wholly unarmored, and consequently unimportant parts of the enemy, and this seems to me to indicate armor-piercing shell as best suited to those calibers. If we have 8-inch guns, the thickness of the secondary armor of our opponent must be known in order to decide whether armor-piercing or common shell is best; if this armor be not over 4 inches thick, common shell will probably get through it and should be used; otherwise armor-piercing shell. This, however, is all on the supposition that the enemy is of comparatively recent construction, having the distribution of hard-faced armor now usual. If of old style, having little or no secondary battery armor, common shell from all but the heaviest guns should be the rule, and, in fact, the guiding principle in all cases should be to use whatever will be most effective against the personnel and the guns of our opponent.

“As to a naval attack on shore fortifications: I assume that such an attack will only be made under circumstances which render it essential to destroy, or at least to silence them for a period, and in my opinion there is only one way to do this—that is, to put the broadsides of the ship as close as possible to the forts, and from a stationary position to overwhelm them by superior weight of fire. In a purely naval action, the better your gunnery the more advantageous it is to you to keep at long range. As distance decreases, superiority depends more and more on number and size of guns, and less and less on marksmanship (I assume, of course, an equal morale on either side). But the stationary platform, the range-finding facilities, and other conditions which obtain in fortifications are the equivalent of an enormous superiority in marksmanship, and the only way to balance this is to get so close that every shot from your guns will hit. If those guns are mounted so high above the water that they can not be effectively reached by fire from a ship at short range, then it is practically impossible to destroy them, and nearly as impossible to render them temporarily innocuous. If, however, they can be reached by naval gun fire from short range, then, it seems to me, the quickest, surest, and, on the whole, the safest way of attacking them is by going as close as possible and getting the most out of the ships' superior weight of fire—within 1,000 to within 500 yards, if possible—using common shell from the heavy guns and shrapnel or canister from some, at least, of the medium guns, the machine guns in the tops within effective range. It seems to me that a single battleship would more effectually dispose of any given shore battery than would a squadron steaming back and forth at 4,000 to 5,000 yards range. Even if the fort be too high to be commanded by guns afloat, the breaching of its parapets,

necessary for its destruction, can only be accomplished from a position near enough to insure every shell striking, while at the same time the small guns will thus be most effective in keeping down the hostile gun fire. It is in breaching fortifications, if anywhere, that high explosive shell would be of great use, their mining power being two or three times that of black powder shell. In this connection note that there will be great advantage, in any maneuvering within range of hostile forts, to steer a course such that the bearing of the fort is constant.

"The latest armor, said to have 20 per cent more resistance than the Harvey armor, is made by the Krupp process, which, though kept secret, may at least be said to be merely an improvement on the Harvey process. Instead of making the plate of steel, containing 3 per cent of nickel, an alloy, containing not only nickel, but also a small percentage of chrome, and perhaps also tungsten, is used, the face of the plate is carbonized by some process which is the equivalent of cementation, and finally the usual cold water spray is used to chill the surface. The result is a deeper chill than is ever obtained by the Harvey process, and a consequent greater surface resistance, tending to break up shell which strike it. Moreover, there is less cracking under shock of perforation. The improvement, however, is not very great. The so-called increase of 20 per cent in resistance means resistance to uncapped shell; when capped shell are used, the increased resistance to perforation is little or nothing.

"As regards the use of armor and its best distribution: It should be recognized that naval victories are far more likely to result from the destruction and demoralization of an opponent's personnel than from actual injury to his ships. At Manila Bay, and again at Santiago, our gun fire did not injure the Spanish ships so much as it did their crews. Armor, in fact, was devised as a means of protecting the personnel from the effects of shell fire, and in so far as this end has been lost sight of, and attention directed mainly to the protection of the water line and motive power, an error has been made.

"As regards the two heavy gun emplacements, the 12-inch armor seems to me to afford reasonable protection except in one respect. I think the port plates of the turrets, which are always toward the enemy, and which are weakened by the port-holes, need further strengthening.

"As regards the 795 tons of armor given to the protection of the 6-inch guns of the *Maine* class: It is to be noted that about half of this is used to cover the space between the top of the belt and the deck upon which the 6-inch guns are mounted. This is to prevent the alleged great destructive effect upon the deck of high explosive shell if allowed to freely enter the space beneath it. I am sure that a much less weight devoted to strengthening the gun deck itself would prevent any such action, and it would seem that some better arrangement could be made than to cover with armor an immense space which contains practically nothing of importance. The smokestacks, 6-inch ammunition hoists, and anything else worth protecting could be directly armored for a small fraction of the weight now used in covering the whole side. I wish, however, to advocate an entirely different arrangement. I have become convinced of the necessity of more complete isolation for guns than we have thus far ever given them. The effect of a single heavy shell bursting in the case

mate might well be to put out of action every gun it contains. I used to think that traverses were sufficient protection against this, and that the advantages of a comparatively open battery deck with free communication from gun to gun were too great to be given up. Smokeless powder renders central battery control much less important than formerly—individual firing must practically be used under all circumstances of action—and furthermore we have had recent practical lessons as to the widespread destruction that may be caused by the explosion of one large shell. If all the guns are in pairs in turrets, each with enough armor to give it safety, unless directly hit by a heavy gun, then no shell can do more than put one pair of guns out of action, and, what I think is of great importance, not only is material damage localized, but so equally is moral effect, each turret will go on fighting, independent of and even quite ignorant of the destruction which may have visited the others.

“To sum up, then, I would advocate two 12-inch turrets with 8-inch turrets on them, and a 6-inch rapid-fire battery between the heavy-gun positions. I should prefer the 6-inch to be in turrets, three pairs on each side of the main deck and a pair on each side of the upper deck; but if in a casemate, I think that each gun should be completely inclosed. As to the superimposed turrets, their advantages are so great as to demand their use, even should the 8-inch caliber be abandoned. Six-inch in turrets must then be placed on the 12-inch.

“Everyone must recognize the great tactical advantages of putting an 8-inch turret on the middle line instead of on the broadside, and the only practicable way of doing this is by the superimposed turret. There have never been but two objections to this plan worthy of consideration: The first, that there would be interference between the two pairs of guns—the loading and firing of one pair disturbing that of the other pair—seems to have been disposed of by the tests of the *Kearsarge*. The second, that there is too much concentration of the battery—too many of your eggs are put in one basket—is still open to argument.

“That an 8-inch turret on top of a 12-inch turret is very much safer than one standing by itself seems to me unquestionable. The turrets themselves have exactly the same chance of being hit, but the loading and training apparatus of one is protected by the thick armor of the 12-inch turret and barbette, while that of the other has only the protection of its own thin barbette armor. If, moreover, the weight of the 8-inch barbette, which is saved by the superimposed turret plan, be used to double the thickness of the 8-inch turret armor, then, evidently, on equal total weight, we have much greater safety from injury, as well as the double offensive power given by the middle line position. The only answer to this is the statement that a shell which enters the superimposed 8-inch turret and puts its guns out of action may also disable the 12-inch guns, but, in my opinion, this is beyond the range of possibility. A burst in the upper turret may drive some fragments down through the loading openings and do some harm in the lower turret, but no serious harm. The heavy plating between the two turrets will prevent that. The only weakness of the double turret is the fact that an injury to the 12-inch training gear will affect a pair of 8-inch guns as well as a pair of 12-inch guns, to balance which we have the fact that there is only one barbette to be hit instead of two, and that one having thick armor. Therefore, certainly the advantages are altogether on the

side of the superimposed turret, and I think that few, if any, of its opponents but would prefer this to the broadside position if only the 8-inch turrets were in question.

“Whatever strength their argument has lies in the contention that four turrets, two on each broadside, are better than two superimposed turrets. Now, personally, I deny this. I contend that the multiplication of gun positions, with an equal increase of the vulnerable area, is of little or no value, unless there be an accompanying increase in volume of fire. The two superimposed 8-inch turrets give the same weight of fire against a single opponent as the four broadside turrets, and the chance of being engaged on both sides at once is too remote for serious consideration. At the same time the four broadside turrets offer twice the target area of the two superimposed turrets. But, without regard to this, if it once be admitted that two superimposed turrets are better than two turrets, one on each broadside, then, in case four are proposed, why not have two of these superimposed, and at least gain that much? I can not but think that the continued opposition to the superimposed turrets is due to an excess of that valuable quality, conservatism. Certainly to delay decision for the sake of a practical demonstration of the advantages of the system is useless, for no such demonstration is possible. Actual tests can and, I believe, have shown that there is no interference of one turret with the other tending to slow its fire or reduce its accuracy, but what more they are expected to show I can not imagine. No practical test, not even the test of actual battle, can do anything toward settling such a question as this. The victory of one battleship over another could hardly be claimed to be the result of a superior arrangement of battery; too many other possible causes may have existed to allow such a conclusion to be undisputed. After all, the lessons of any future naval combat are only the conditions drawn by reasoning from certain facts or alleged facts and are just as open to dispute, just as likely to be denied, as are the conclusions drawn from the vast storehouse of past experiences.

“If we wish to be in the van of progress we must act upon well-considered conclusions drawn from past experiences, trusting that the future will confirm our judgment. If we refuse to accept any change until its advantages have been fully demonstrated by actual experience, we must always be behind the times.”

The study of naval engagements since the use of explosive shells fully bears out Professor Alger's statement that “the widespread effects of the large caliber shell are needed to produce decisive results.” His discussion of the kind of shell to use in action is instructive, although necessarily inconclusive. The college suggests as an addendum that a good rule would be, when in doubt use common shell. In his conclusions regarding attack on fortifications the college fully concurs. He is also in accord with the views of the college in his opinions upon the distribution of armor and battery on shipboard, especially as to the tactical advantages of superimposed turrets, and his discussion of this subject is given in

full with the hope that it may convince many who are still in doubt.

Professor Alger's concluding remarks in this lecture are such forceful words of wisdom that they are repeated in italics.

Naval Constructor Capps delivered a most interesting lecture upon The Development of the Battleship and the Composition of the Fleet.

The lecturer was compelled from lack of time to simply touch upon many of the great and interesting points of battleship construction in our own service, and the comparison of these with the ships of foreign navies, and accompanied his remarks with illustrations from scale drawings of many of the ships. In the opinion of the lecturer the question of sheathing our large men-of-war was no longer in doubt; all ships should be sheathed, but if this could not be accomplished certainly those should be sheathed which were likely to serve on foreign stations or away from convenient docking facilities.

Naval Constructor Baxter's lecture upon the subject of Dockyard Administration was interesting as stating clearly and concisely the methods pursued in our own country, offering comparisons of these methods with those of foreign countries, and suggesting lines of improvement where he deemed it necessary.

Surgeon Beyer gave a series of five lectures on Naval Hygiene.

The following are synopses of these lectures in the order of delivery:

Lecture I.—Definition of hygiene. Introductory remarks. Necessity of instructing naval personnel in personal hygiene. General considerations on hygiene of air, water, and food. Influence of hygiene on discipline. Bacteria, how classified; their life histories, characters, properties. Disinfection. Sterilization. Pasteurizing. Preparation of culture media. Bacteriological examination of water, air, and the soil. Influence of Koch's methods on development of bacteriology. Lantern slides.

Lecture II.—Value of human life. Health is wealth. Health and disease defined. Different theories as regards causation of disease. Infectious nature of disease akin to fermentation in fluids. Influence of bacteriology upon our knowledge of the causation of disease. Reduction of mortality. Immunity. Antitoxin, its preparation and strength determination. History, progress, causation, and prevention of the plague. Malaria, its influence upon acclimatization. Life cycle of malarial parasite. Means recommended for the prevention and extermination of the mosquito. Lantern slides.

Lecture III.—Ventilation. Pure air. Influence upon it of (1) respiration, (2) illuminating agents. Temperature of air influenced by respiration, heating, and

lighting. Dust. Air influenced by peculiar construction of ships. Testing the quality of air, (1) by determination of carbon dioxide; (2) of organic matter; (3) by increase in temperature. Calculation of air supply to satisfy requirements of hygienic conditions. Causes of natural atmospheric currents. Natural and artificial ventilation. The principle of ventilation by wind sails. Recknagel's illustration of natural ventilation of rooms. Overpressure, underpressure, neutral zone. Artificial ventilation. How long to aerate. Limits of ventilation. Parts of the ventilating plant. Locality from which air is taken. Purification of air before it arrives in living spaces. Air propelled by blowers. Temperature and moisture of air for breathing purposes. Inlets and outlets of air during ventilation. Inspection of a ventilating system. Testing its working efficiency.

Lecture IV.—Water. The necessities and uses of water. Allowance. The water reservoirs of nature. Rainfall. Rain water, its character and quality. Surface water and sewage. Sea water. Hygienic significance of water supply. Epidemics of cholera and typhoid fever due to faulty water-supply systems. Insufficiency of chemical analysis alone in estimating the quality of drinking water. Testing water. Collection of sample. Microscopical, bacteriological, and chemical examinations. Method usually employed on board ship. Rules to be observed as regards water supply when quartering men in towns. Comparative values of supplies by rain water, spring water, well water, and river water. Purification of water by boiling, freezing, chemicals, distillation, and filtration. Significance of the so-called "septic tank." Demonstration of Schumburg's method of purifying water in the field. Lantern slides.

Lecture V.—On food and digestion. Composition of the human body. Methods of determining metabolism. The functions of water, salts, proteids, fats, and carbohydrates in a diet. Genussmittel. Alcohol. Fuel value of organic food substances. Preparation of meats by boiling, roasting, frying, and baking. Volume and consistency of a diet. Differences between vegetable and animal diets. The proper proportions of a mixed diet. The ration and how it must be determined. Distribution of ration between the different daily meals. Influence of the nervous system upon digestion. The value and significance of recruiting. Needed reforms in our system.

In the closing remarks of the last of this series, the lecturer dwelt upon the question of recruiting as a very important one, vitally affecting the efficiency of the service.

The following extract from this lecture is given at length as containing useful information for those to whom this duty is intrusted:

"Hygiene, whether national, state, municipal, military, or naval, makes the living man its central object of study and care. His health, comfort, and even happiness are the focal points in the aims of the hygienist and sanitary officer. These humanitarian principles will be found at the bottom of all sanitary ordinances, and are, in fact, the key, not only to a proper and intelligent understanding, but also to a correct appreciation of their origin and intentions.

"The methods employed are, in the main, two in number. In order to make man morally, as well as physically, strong and healthy, our method would be mainly educational in character; to keep him so, it must be preventive.

"Both methods, however, work side by side, for the one complements the other. Our present civilization, being, as it is, the result of the constant and progressive evolution of social conditions, steadily requiring or exacting greater physical and moral qualifications from generation to generation, and making the attainment of these, at the same time, more difficult as time goes on, hygiene and the application of its principles to practical life are gaining more and more in importance and are demanding also a correspondingly increased share of our attention.

"If we accept the results of the more recent calculations as regards the duration of the average human life in civilized countries, which is 45 years, and consequently may assume that under the most favorable conditions of heredity and environment it should last about 90 calendar years, the whole human life-cycle might be divided into three great periods of 30 years each.

"The period included between birth and 30 years of age would correspond to that time of life during which our educational forces are intended to do their best and most effective work, and both experience and observation agree in showing this to be the case. Consequently we educate during that period more than during any other, although it may still be truly said that our whole life is a school with experience for our teacher.

"The period between 30 and 60 years would then mean that during it man is performing his best work, arriving at his zenith at about 45 years of age. This middle period of normal life in its significance and usefulness will very naturally greatly depend upon the success with which the preceding or developmental period was concluded and which it has for its formation, while the period from 60 to 90 years, during which decline and death occur, must be the result and reflex of both the preceding periods combined.

"It is during this last period more especially that nature has her reckoning with man. She then proves to him either that repentance comes too late or that a painless decline of his powers and a normal death from old age can only be the reward for a correct and useful life.

"During the second period, which might also be called middle life or the prime of life, preventive hygiene plays a more important part than educational hygiene, for it is the active, stormy period during which the battle of life is fought out either for better or worse, and the greatest dangers are to be met. A man's usefulness and the value of his work during this period of his struggle for existence will be directly proportional to the success with which he has been reared and taught during his development or formative period.

"Owing, therefore, to the great importance and the far-reaching influence of this period upon the later years of life, the attention of students of all classes and from all departments of science has ever been attracted to the child and the youth. A great deal of practically useful knowledge has in this manner been accumulated; and it therefore becomes our duty to see and find out if some of the lessons may not be applied with advantage to the best aims and interests of naval and military life.

"No one acquainted with naval or military life will deny that the requirements which such a life imposes upon the physical and moral strength of the individual are very great. The almost universal custom of selecting men and

boys for their fitness for the life by examinations, both physical and mental, and practiced by every civilized nation in the world, is the best proof of its not being merely an insignificant matter of form, and the care and training devoted to the men after they have enlisted would only tend to still further confirm this fact. To disregard the serious side of the duty of recruiting would imply the committing of the first and most serious offense against the personal hygiene of an army or navy and of the first military mistake in our methods and organization. The recruit being the corner stone from which armies and navies are built up, a deeper recognition of his importance seems very desirable.

"The examination of men for their fitness for the military and naval services must be based upon a knowledge of the facts regarding their physique, and the inferences for a future life of efficiency and usefulness to be drawn therefrom. We must take a careful and well-considered account not only of the points in the anatomy of men, but we must appreciate their significance and influence upon the kind of life before these men.

"The greatest assistance and help in the work of selecting the proper kind of men, we obtain by consulting growth and development tables. Within such tables we shall find the data descriptive of most any type of man we set ourselves to select; in them we find not only the means and averages of all the dimensions of man capable of measurement, but also their derivations from the averages arranged in percentages. There being at present practically no standard in the Navy, why not adopt one?

"Besides the lack of a uniform standard to guide us in the selection of the best material there are brought to bear on the physical examiners all sorts of influences that prove most injurious to the qualitative composition of the personnel of the service.

"The commanding officer of a ship or station wishes certain men very particularly; one of these may have no teeth and the other may have a rupture. The executive officer has in view some more men especially useful in his department, and he wants them, no matter what their physical condition. The paymaster has certain favorite clerks and yeomen, the doctor certain hospital stewards and apprentices, and the bandmaster brings aboard a collection of cripples, the only ones in his opinion who can play certain difficult but very desirable instruments. Our political friends at Washington, and through them many of our most valuable citizens on shore, are constantly making the most strenuous efforts to push into the Navy certain protégés from among their number, some of them, although ex-inmates of reform schools, and otherwise of no use in any walk of life, are forced upon the service. And when we realize that these influences are constantly at work on every ship and station, how can it be otherwise that the service will sooner or later be stocked with burdens and impediments, rather than efficient men? How can we avoid getting a large proportion of our numerical strength of personnel on paper, rather than on the list of availables for use in an emergency which is sure to come. Need anyone wonder that the United States Navy, during the ten years from 1887 to 1897, when compared with other navies, shows by far the greatest number on the list of those who were discharged as unfit for the service, and this notwithstanding the fact that we have

the choice of men, while other nations draft whomever they can get. But, without on the one hand an accurate standard and an intelligent use of it, and on the other hand with injurious influences counteracting even our efforts such as they are, we simply do not take advantage of our opportunities.

“Table showing per 1,000 numerical strength those admitted, those discharged as unfit for the service, and those that have died, from 1887 to 1897, annual values.

Navies.	Admitted (sick).	Discharged (unfit).	Died.
Russia	1,159.26	22.63	7.19
Austria	698.75	22.12	6.85
Italy.....	412.33	9.81	5.19
Japan	386.77	8.91	8.74
United States.....	830.74	71.57	5.40

“Of the European navies, Russia gives 22.63 per 1,000 of numerical strength as discharged as unfit for service. This is the highest number among them, excepting that of the United States Navy, which shows the astonishing figure of 71.57, nearly three and one-half times greater than that of Russia, and nine times as great as that of Japan. Such conditions point directly to faulty recruiting, because the number of our own death rate is among the smallest.”

Lieutenant Richmond P. Davis, U. S. A., who, with Lieutenant William Chamberlaine, U. S. A., was in attendance upon the course, delivered an interesting lecture upon Security and Information. The lecture was accompanied by charts and diagrams illustrative of the subject.

While, as he states, the subject is as old as the art of war itself, he calls attention to the fact that its tenets are even now violated; that even so late as the Spanish-American and British-Boer wars both attacking nations have been ignorant of the terrain, movements, and resources of the enemy.

“It is to be regretted that in our service little attention is given in time of peace to perfecting the details of this organization (the intelligence); and, as in many things, the motto seems to be to wait until the time comes and trust to Providence. When we come against a worthy foe the fallacy of such policy will be most strongly emphasized.”

He also calls attention to the probable value of the bicycle and automobile in reconnoissance and outpost duty, but thinks that both will find their greatest usefulness in the conveyance of information from the front to the rear.

The remainder of the lecture is devoted to the details of security and information.

The college believes that the importance of intelligence is not overestimated by the lecturer, and that too much attention can not be given to the perfecting of our own system. A few dollars properly expended in time of peace may save hundreds of thousands in time of war, to say nothing of the success or failure of an expedition.

Lieutenant J. M. Ellicott, U. S. N., of the college staff, delivered a lecture upon The Strategic Features of the Philippine Islands, Hawaii, and Guam.

Lieutenant Ellicott had spent a year in the Hawaiian Islands, a year and a half in the Philippines, and had visited Guam. A report of his reconnoissance of Oahu and other parts of the Hawaiian group is in the archives of the college, and many of the suggestions in this report are adopted in the solution of the college problem of 1900.

Having made an extended reconnoissance of the islands and harbors of the Philippines, Lieutenant Ellicott says, concerning the selection of a naval base:

"Without prejudice in its favor—in fact, with an early prejudice against it—I have concluded that the place which presents the strongest topographic and hydrographic characteristics for such a purpose is Ilo Ilo.

"This port lies on the southeast side of the island of Panay, on a point projecting into the Strait of Ilo Ilo and masked by a semicircular portion of the island of Guimaras. This island is 25 miles long, 9 miles wide, and 700 to 1,000 feet high; bluff, rugged, and thickly wooded. Between Panay and Guimaras is a strait from 7 to 20 fathoms deep and from one-half to $1\frac{1}{2}$ miles wide, leading to open water in either direction, good sea room being 8 miles distant to the southward and 11 miles to the northward. Abreast of Ilo Ilo the Guimaras bluffs drop back into a semicircular bight where thirty battle ships could lie absolutely concealed from outside. For three-quarters of a mile in one part of this bight there is deep water to the very beach, and at another point within it there are natural springs producing a potable water supply that has never been exhausted at any time by commercial demands. I believe that a site selected on this bight on Guimaras Island opposite Ilo Ilo for a naval base, including dry docks, repair shops, coaling station, and supply depot, would be preeminently the strongest to be found in the Philippines. Its strategic advantages would be the following:

- "1. It would be at the geographic center of the group.
- "2. It would lie in a good food-producing district.
- "3. It would be contiguous to a community from which to draw for labor.
- "4. Its natural potable water supply would be inexhaustible.
- "5. Its climate and healthfulness would be superior to almost any other site that could be selected.
- "6. It can harbor the largest fleet we can contemplate, and completely conceal from outside reconnoissance.

"7. Its dry docks and coaling docks could be so located as to require but little dredged approach.

"8. It is in the neighborhood of good timber on the immediately adjacent islands and within 130 miles by interior waterways of the marble quarry of Romblon Island.

"9. It would be absolutely unassailable by gunfire from outside waters.

"10. Its channels of approach can be mined at many points, and some parts are especially favorable for dirigible or automobile-torpedo defense.

"11. From the bluff and serrated shores of Guimaras Island the mine fields could be controlled and protected by well-masked observation stations and batteries.

"12. The rugged and thickly wooded surface of Guimaras presents special features of difficulty for a hostile landing force endeavoring to reconnoiter the base or to attack it in the rear, and would render its land defense comparatively easy.

"13. The sites for permanent fortifications are almost ideal.

"14. Last, but most important in the features of strategic strength, is the fact that there are two channels of egress from Ilo Ilo, which, owing to the impassability of Guimaras Strait for battle ships, debouch over 300 miles apart by navigable water. It would therefore take two divisions of the enemy to blockade a fleet in Ilo Ilo, each of which, being wholly out of touch with the other, would have to equal the whole blockaded force. Ilo Ilo, as a naval base, properly fortified, would be strategically equivalent to two fortified single exit bases in the Philippines situated 300 miles apart, or, from another point of view, a fleet mobilized at Iloilo would have double its numerical strength in its demand upon the attention of the enemy.

"The objections that might be raised to Ilo Ilo as a site are, as far as have occurred to me:

"1. It is 300 miles from the present chief commercial center of the islands.

"2. The harbor is rather deep (13 to 20 fathoms) for anchorage, and currents are strong.

"3. The cost of fortifications would be great, at least double the cost for a single exit harbor.

"The first of these is not, to my mind, a strategic objection. No commander in chief would waste a single shot on taking Manila so long as his opponent on the sea was safely harbored elsewhere in the islands.

"The second objection can be easily overcome by an adequate number of buoys properly moored.

"The third objection is the only serious one; but when it is remembered that by creating an impregnable naval base in the Philippines and sending to it an adequate fleet we would be able to hold any hostile naval power in the world, unless it were Great Britain, more than 5,000 miles from our main Pacific coast, the strongest strategic site for that base should be cheerfully selected, regardless of cost.

"To avoid becoming tedious with topographic description, I will only say of other places in the Philippines that I have found from personal reconnoissance and persistent inquiry among local pilots and others that the following places possess some characteristics of natural strategic strength or resources: Cebu, Romblon, Usan Bay in Masbate Island, Port Sorsogon, and Zumarraga, island of Buad; but none of them possess half the natural strategic strength or resources of Ilo Ilo.

"Of Subic Bay more must be said, for it possesses so many of the characteristics of strategic strength that it divides attention with Ilo Ilo. To avoid repetition in these, I will only enumerate the qualifications in which the two places differ. In Subic's favor it may be said that:

"1. It is much closer; indeed very close to the chief commercial center.

"2. The natural site in Subic, Olongapo, has somewhat better anchoring ground, is free from currents, and is more cut off from prevailing winds.

"3. The cost of fortifying Subic would not be more than half that of defending Iloilo.

"Against a site in Subic Bay there are three objections, as compared with Ilo Ilo.

"1. It is not centrally located.

"2. It is 300 miles farther from San Francisco via Guam and Hawaii.

"3. It has but a single exit.

"The third would, to my mind, absolutely exclude this site from consideration when such a place as Ilo Ilo is available. If our fleet were blockaded in Subic, it would be at a disadvantage, even though somewhat superior in strength to that of the enemy. If it were blockaded in Ilo Ilo, it would be in a position of advantage, even though little more than half as strong. Assuming the enemy's force operating in the islands equal to ours, we would have to give him battle at a disadvantage in order to issue from Subic (for only four battle ships could venture out abreast), but, by selection of opportunity, we could issue from one or the other channel of Iloilo, either wholly unopposed or in the face of a force considerably inferior to ours."

Concerning Guam as a coaling station the lecturer said :

"The harbor of San Luis d'Apra is the only one, and is fairly well sheltered. A breakwater on Calalan Bank, three-quarters of a mile long, in 4 fathoms of water, would produce a perfectly landlocked basin more than a mile wide and 2 miles long, with smaller accessible inner basins. These have just been thoroughly surveyed.

"The best site for a coaling station—to my mind, the only one—is at Soumaye, on the south side of the harbor, where piers could be built from the coal pile to deep water over a reef awash. This site is protected from bombardment on all sides but the north by the configuration of the land, being on a level shelf semicircularly inclosed by bluff hills 100 to 300 feet high. To bombard it, ships would have to maneuver north of Luminan Reef at a distance of 2 miles. If the harbor were adequately fortified, the enemy could be kept beyond bombarding range.

"So long as Guam is not fortified, it may, in time of war, be taken and retaken by whichever combatant happens at the moment to have the stronger force in its vicinity, so that it would seem wise, if we go to war while Guam is unfortified, to keep coal and supplies afloat in vessels in the harbor, with what naval protection we could assign, ready for flight or sinking upon the approach of the enemy in superior force."

Lieutenant L. H. Chandler discussed Torpedo Operations in Naval Warfare. As this lecture has been published, no abstract is given. The college is not in full agreement with the lecturer in his belief that there is no reason to expect torpedo attack on our own coasts in war

with a foreign naval power, but believes that in spite of all the attendant difficulties, an enterprising enemy would bring torpedo vessels across the Atlantic. In this case, however, their operations would be of but little utility unless, as the lecturer points out, the enemy had established a secondary base on our coast.

Captain George O. Squier, U. S. A. (Signal Corps), delivered one lecture upon the Influence of Submarine Cables upon Military and Naval Supremacy, from which the following paragraphs are quoted:

"The story of the Spanish-American war is largely a story of 'coal and cables.' That war for the first time demonstrated the dominating influence of submarine cable communications in the conduct of a naval war. As a result of it the principal maritime powers, with colonial possessions, are each at present elaborating their 'cable policy,' and have awakened to a realization of the fact that reliable submarine communications under exclusive control are not only absolutely necessary, but exercise a dominating influence upon the control of the seas, whether in commercial strategy or in military and naval strategy.

"It may be said, that the very foundation of successful naval strategy is efficient and exclusively controlled communications, and the lack of them more serious than inferior ships.

"England's sea power is not alone measured by the number, character, and tonnage of her war ships; it is immensely increased by the system of exclusively controlled submarine cable network, at present including four-fifths of all the cables in the world, woven like a spider's web to include all her principal colonies, fortified ports, and coaling stations.

"Although submarine cable communication is scarcely fifty years old, yet the British Empire is bound together in one vast intelligence-transmission system, with London as its center. Nothing important can happen at any quarter of the globe which does not find its way to this great world's news exchange—London. And this system is and has been a principal element of her strength and has largely made possible a government including subjects naturally widely differing in character, habits, and modes of thought.

"This great cable system as at present existing is the more important from our present standpoint since no other country has such a system, and this fact has placed in the hands of the British Empire a powerful means of real dominion over the rest of the world.

"The proposed British Pacific cable has been prominently before the British Government as an imperial measure for a number of years. Its construction is now assured beyond a reasonable doubt. The route from Vancouver is to Fanning Island, thence to Fiji Islands, thence to Norfolk Island, and from thence by two branches to New Zealand, and the eastern coast of Australia. In the Indian Ocean it is proposed to connect Western Australia to Cocos Island, and thence to Mauritius, and from thence to Natal and Cape Town. Cocos Island is further to be connected with Singapore by a branch cable."

Captain Squier next gives an estimate of the cost of a United States colonial telegraph system:

CABLES IN THE PACIFIC.

Trans-Pacific cable, San Francisco, via Hawaiian Islands, Midway Island, and island of Guam to Luzon	\$12, 000, 000
Inter-island communication for the Hawaiian group	150, 000
To complete the inter-island telegraph system of the Philippines.....	250, 000
For Alaska telegraph system, as already authorized by Congress.....	450, 000
To extend the Alaska telegraph system and to connect it to the United States by direct cables, and also for further extension to the Philippines via the Aleutian Islands, providing a duplicate trans-Pacific route to the Philippines.....	10, 000, 000
For cable connections with Tutuila Island coaling station at Pago Pago Harbor	650, 000

CABLES IN THE ATLANTIC.

Direct cable from the coast of the United States to the Island of Porto Rico.....	1, 500, 000
Total	25, 000, 000

“For the expense of three or four first-class battle ships, the United States can provide herself with the most powerful means known for extending and preserving her commercial influence—for the speedy pacification and civilization of the people who have recently come under her control, and secure a strategic advantage—military, naval, and political—which is necessary to the position of the United States as a world power.”

Speaking of the strategic value of the United States Pacific cable, Captain Squier says:

“The successful completion of the submarine cable across the Pacific will mark an epoch in the telegraph history of the world. After thirty years of consideration—technical, commercial, and political—the end of the century sees this great enterprise at last seriously undertaken. The full influence which it will exert upon the Western Hemisphere, and the world in general, is not easily appreciated. Strategically the importance of the intercolonial communication and its preservation are very great; however, the Philippine question should not overshadow the larger question—the Eastern question—in the consideration of this project. Important as the cable will be as a means of joining the Philippine Archipelago to the United States, its larger importance will ultimately be in the future of the commercial development between the United States and the East. In the broad extension of the Pacific trade consequent upon the completion of the Isthmian Canal, and the development of steamship lines plying the Pacific, the telegraph cable would naturally become an important factor. The trans-Pacific steamship lines are heavily handicapped by absence of direct means of telegraphy between the ports between

which they operate. Situated on the main trade routes leading from the canal to Asiatic ports, the Pacific cable will serve as a powerful adjunct and support to this enterprise. The two go hand in hand and are mutually closely related."

Concerning the military control of telegraph cables in time of war the lecturer cites our action during the Spanish-American war.

"By his instructions General Greely recognized the existence of five classes of cables:

"First. Those of which the termini are in the enemy's country; for instance, the Cuba submarine cable system along the south coast of Cuba.

"Second. Which directly connect countries at war, so that each belligerent controls one end of cable; for instance, the International Oceanic Telegraph Company between Florida and Habana.

"Third. Where one end of the cable is in enemy's country and the other in neutral territory; for instance, the West India and Panama cables extending through Cuba to Porto Rico, and thence to St. Thomas.

"Fourth. Where a cable extends from the coast of an offensive belligerent to a neutral country contiguous to the territory of the defensive belligerent; for instance, the Haiti cable from New York City to Haiti, where there is direct cable connection with the island of Cuba.

"Fifth. Other cables having one terminus in the territory of the offensive belligerent and the other in neutral regions remote from the scene of hostility; for instance, the Atlantic cables connecting the United States with Europe.

"To cables of the first class, whether the property of the defending enemy or a neutral corporation, was applied the simple and well-known rule that they are subject to the vicissitudes of war, and that being in use for war purposes they are proper objects of offensive military operations. The orders issued to the officers of the Signal Corps looked upon those cables, whether they were laid in the high sea or along the immediate coast, as liable to seizure and total destruction.

"Cables of the second class were easily dealt with. The cables between Key West and Habana were taken possession of militarily by Spain in Cuba and by the American army in Key West. Messages going and coming were subjected to the most rigid military censorship at both ends of the cable. Only messages in plain text bearing upon business and social subjects were permitted, and where any suspicion existed as to the loyalty of the sender were either refused or not sent. Exceptional cipher messages were permitted as a matter of courtesy and favor to selected diplomatic representatives of neutral nations.

"The cables of the third class were viewed as contraband of war; but it was also recognized that their liability to destruction depended in a measure on the locality of the cable. General Greely recognized as unsettled and of doubtful expediency the right of any belligerent to raise from the bottom and destroy on the high sea a neutral cable, merely on the ground that such cable landed in a hostile country. He, however, applied a more rigid rule to such portions of cables, cable huts, instruments, etc., as were located within the territorial jurisdiction of the enemy. Orders given based on the principle that such cable property, whether belonging to an enemy or to neutral corporations, are not only subject to the vicissitudes of war,

but, being contraband of war, are legitimate objects of military operations. In accordance with this view his orders to Colonel James Allen, Signal Corps, charged him to use his utmost efforts to cut off the south coast of Cuba any cable that could be grappled and picked up, either within a marine league of the coast, or within range of Spanish batteries.

"In Cuba and Porto Rico, during the Spanish-American war, certain neutral cable stations of this class fell within the power of the army of the United States. In such cases the officials of the neutral cable companies were given a choice of action. They could abandon their property to the vicissitudes of war, or accepting the force majeure, were allowed to transact business under strict military censorship. Even during the siege of Santiago the orders permitted the French Telegraph Cable Company to accept business for Santiago de Cuba within Spanish lines, every such message, however, to be viséed by the military censor.

"The fourth class of cables was seized by the military forces of the United States and operated under strict military censorship. Code and cipher messages were absolutely refused, save for the authorized Government agents and certain excepted diplomatic representatives, the latter as a matter of courtesy.

"Cables of the fifth class were placed under a military censorship. Of these, there were six systems comprising separate cables. Most of these telegraph cables were only constructively seized, General Greely taking the responsibility, which he believes to have been the most effective method, of intrusting the direct censorship of messages, under general supervision of an officer of the Signal Corps, to the respective superintendents, men of high character, whose good faith was guaranteed by the companies whose interests they likewise guarded. The interests of the United States were thus subserved while the privacy of the affairs of the companies was conserved. The responsible officials gave a written pledge to observe such rules as might be filed by the chief signal officer with the companies. Those rules prohibited all messages to and from Spain, and also certain other classes which were deemed prejudicial to the military interests of the United States. In cases of doubt, messages of the latter character were examined and viséed by the military censor."

The college strongly indorses Captain Squier's proposition contained in the following paragraph:

"Since submarine cables have become such a dominant influence in time of war, and since the cases which may naturally arise are often complex and involved, it is clear that a further international cable conference is a necessity of the near future, in which a more definite international understanding of methods of procedure in time of war may be agreed to. This international conference could properly consider other international cable matters, which the great advance in submarine telegraphy has made so important. Among those may be mentioned the construction and authorization of a uniform international cable code, for the economical and efficient communication between different parts of the world in any of the principal languages now authorized by the international telegraph rules. Since next year will be the fiftieth anniversary of the first successful submarine cable, this would perhaps be a fitting time for the calling of such an international cable convention."

The lecturer's suggestions in regard to the cable equipment of a fleet and the defense of cable landings are worthy of much serious consideration and should be acted upon in our Executive Departments.

"Supply of spare cable and suitable instruments for working the same must be available with every naval fleet in order to supply the necessary communications with the shore in case of the landing of either a cooperating army or of temporary forces from the ships. Cable ships engaged in either laying, cutting, or repairing cable near the shore must either be provided with their own means of defense, or else convoyed by warships.

"The above facts make it clear that a new type of naval ship is to make its appearance as a necessary adjunct to every naval fleet. Just as the naval repair ship, such as the *Vulcan*, has been found useful and necessary, so will the new cable cruiser be an essential part of the navy of the near future. It is not intended here to enter into the question of the proper design of such ships best adapted for the purpose, but it would seem that a specially designed cable ship, with comparatively large coal capacity and high speed and an armament of the lighter cruiser class, making her capable of defending herself and protecting her small boat parties, would be general conditions for the naval cable ship of the future. She must carry a moderate supply of spare cable machinery for laying and picking up cable, as well as instruments for testing and operating a cable, and the necessary buoys, suitable, if necessary, for buoying the cable and operating the ship as a floating cable station. It is unnecessary to state, also, that her personnel must be specially trained in the highly technical duties required and, from actual practice in all the operations necessary, be made ready for the performance of their duties efficiently under the conditions of war.

"Although these naval cable cruisers in time of peace could be profitably employed in maintaining and repairing both cables belonging exclusively to the Government and those subsidized by the Government, under suitable arrangements, yet at the outbreak of war they should be absolutely and exclusively under the control of the Government. It may be said at present that no modern fleet is complete without a cable ship especially adapted for cable operations in time of war.

"In addition to special cable ships, it is desirable and necessary that every warship should be provided with certain simple cable appliances for raising and cutting cables, and should have at least one person aboard familiar with the practical and technical side of cable operations.

"It would seem advisable, in case of Government cables, or in cables subsidized by the Government, to keep the exact route of important cables a secret, and prevent the publication of maps for general distribution, showing the exact location of cables in the deep sea. The location of the shore ends, however, are certain to be known, and will probably be the point where the cable must be located and interrupted. This forces, therefore, adequate land and naval protection for the landing places of all important strategic cables.

"A cable landing, for the future, should partake of the character of a fort, and be provided with ample and adequate means for preventing an enemy locating and destroying the cable within the marine league, or indeed, until it has reached deep sea, where its accurate location is not known."

Lieutenant Godfrey L. Carden, U. S. R. C. S., presented a lecture on How may the Revenue-Cutter Service Render most Efficient Service in Time of War?

The lecturer commenced by stating that any suggestions he had to make would be confined to such as were possible without legislative action to carry them into effect. He gave an historical retrospect showing that revenue cutters had taken part in the naval operations of every war but one in which the United States had been engaged, and that they had borne an active part in clearing the Gulf of Mexico of pirates in the early part of the century. He emphasized the point that existing law makes the whole revenue marine available for military duty and cooperation with the Navy at the discretion of the President, and gives the readiness of the cutters and their crews for war service as the measure of their naval value.

The lecturer reviewed the experience of several of the principal cutters in the late war with Spain as a basis for improving the war utility of the revenue marine. He found that much time had been lost in fitting them with battery, magazines, machinery, protection, etc., the vessels being sometimes five weeks in navy-yards before they were ready for service, and advocates the proper original construction of revenue cutters for war, and their being fitted with gun mounts in time of peace, the guns and all other military supplies being kept in store, ready to be placed aboard the cutters when hostilities become imminent, thus having them ready for immediate service on an outbreak of war. Other recommendations made by the lecturer are the interchange of continuous service men between the Navy and the Revenue-Cutter Service, with the object of securing instruction for the latter; the mounting of one or two guns on each cutter in time of peace for training the crews; the occasional detailing of revenue-cutter officers to duty aboard battleships; the temporary detailing of revenue cutters to the North Atlantic and Pacific squadrons for exercise in fleet tactics, target practice, etc., and the assembling of revenue cutters for work as a flotilla for coast defense. Details were given of the latest cutters, including those under construction, showing their adaptability for use as gunboats or small cruisers, in which position they would be vastly more efficient than any hastily extemporized from the merchant service.

WAR PROBLEMS.

The principal problem for 1900 created a theater of war in the North Pacific, with the main theater of operations on our Northwest coast, and minor operations involving the utilization and defense of our insular possessions in Pacific waters.

The discussion of this problem was carried on throughout the session; at first as to the general strategy of the campaign and later as to the technical details. Lectures, tactical situations, and war games were so arranged as to apply the principles of strategy and coast defense to our Pacific northwest coast and the waters of Puget Sound and adjacent waters, as the chief theater of operations, and to draw from the same theater illustrations of these principles.

By such means the attention of officers was continually centered upon the strategic and tactical features of this part of the coast, the naval resources of the country, and the most effective plans to be carried out under the probable conditions of war. Several solutions of the problem, one from each of the several committees, and in addition thereto several individual solutions, were submitted. The discussion of these plans are, however, considered confidential, and are therefore omitted from this Abstract. Like the solutions of previous years, the final, or collegiate, solution will be submitted to the Navy Department.

Much interesting data and valuable information used in the solutions of the problem were received from the Office of Naval Intelligence, Navy Department, the Bureau of Military Information, War Department, and from the branch hydrographic offices situated within the area under consideration. Credit is especially due to Lieutenant A. N. Wood, U. S. N., in charge of the branch hydrographic office at Portland, Oregon, for valuable and intelligent cooperation.

During this session the college was fortunate in having two officers of the United States artillery, Lieutenant Richmond P. Davis and Lieutenant William Chamberlaine, who devoted the entire period of their usual summer's leave of absence from their regular duties at the Military Academy, West Point, to duty in attendance upon the course.

From these officers many valuable suggestions were received; and the assistance rendered by them, more especially in the solution of the land or purely military phase of the principal problem and of minor problems of harbor defense and attack, made the solutions of these problems most interesting and instructive.

In solving the principal problem for the year the strategic necessity of cable connection with Hawaii was made apparent to all.

This extension of our land lines as a war requirement of the first order was emphasized by Captain Squier, of the United States Signal Corps, in his lecture during the course. The projects of connecting Hawaii by cable with the United States and of completing the line of telegraphic communication by both cable and land lines with the extreme northwest of Alaska are already acknowledged necessities in the commercial world, but the solution of strategic situations in this theater proves beyond question, even if it were not glaringly apparent to any observer, the urgent war necessity of not only building, equipping, and maintaining these lines, but of developing them into trans-Pacific telegraph systems connecting our west coast with our oriental possessions.

A number of minor war problems were solved and much individual work accomplished by the officers in attendance within the area of the principal problem for the year.

Interesting papers bearing upon this area were submitted by Captain Barclay, Captain Courtis, Commander Emory, U. S. N., and Lieutenants Richmond P. Davis and William Chamberlaine, U. S. A.

WAR GAMES.

During the past year all the war games, the duel, the fleet tactical, and the strategic games have been advanced and improved. The general method of playing them remains the same, but the rules for playing them are frequently revised and have been recently much modified by data derived from the practical exercises of the North Atlantic Squadron.

As in preceding years, these games have proved of great interest to all officers in attendance. They have performed the dual office of affording a means of mental training and of special professional investigation, and have been most satisfactory.

As already mentioned in this Abstract, the cordial, intelligent assistance of the officers of the Army in attendance has enabled the college to codify rules for playing the fleet against fixed defenses, and vice versa, extending the fleet tactical game to operations embracing the attack and defense of harbors and in the vicinity of fortifications.

A number of the duel or single-ship games were played between ships of both the *Iowa* and *Kearsarge* class. The problems embraced cases where both ships possessed equal speed and turning circles, and also those in which both ships had the same circle but one possessed 20 per cent superiority of speed. The questions to be determined were the best tactics in the former case, and the value of superior speed in the latter.

On the fleet tactical game board a great number of games were played, the majority being worked out on the following theorem, viz: "To determine the value of 20 per cent superiority of speed."

Of the strategic games the greater number played consisted of problems whose theater lay on the Atlantic coast of the United States, the Caribbean Sea, or the Gulf of Mexico. In addition to these, several new problems of operations within the area embraced by the principal problem for the year were worked out.

A complete record of all games of each class is made up and filed in the archives of the college for subsequent reference and study.

An example of a strategic situation is given as of interest to those who have not attended the college course:

War exists between Blue and Red.

Temporarily based on Delaware Bay is a Red force consisting of 3 A, 3 B, 6 C, 6 D, and 3 E.

Two Blue squadrons are near by—one in Chesapeake Bay, the other in Nantucket Sound. Each Blue squadron consists of 2 A, 2 B, 4 C, 4 D, and 2 E.

At 3 a. m. October 2 (the time being unknown to Blue) the commander in chief of Red learns that the Blue Chesapeake force sailed at midnight, with the intention of joining the Nantucket force. The object of Red is to prevent this junction of the Blue forces without becoming engaged by a superior force.

Weather fine; daylight from 6 a. m. to 6 p. m.

Limit of time, four days from midnight, October 1.

Limits of play: North of $37^{\circ} 00'$, west of $63^{\circ} 15'$.

Initial points of measurement:

Nantucket, Great Point Light-house.

Chesapeake Bay, Cape Charles Light-ship.

Delaware Bay, Five Fathom Bank Light-ship.

Two committee will take the Red, four committee will take the Blue.

PLAN OF RED.

Red main fleet, composed of 3 A, 1 B, 3 C, 1 D, will leave Five Fathom Bank Light-ship at 3 a. m. October 2 on a course ESE. $\frac{1}{4}$ E. and run at a speed of 10 knots until 7 a. m., when stop, and remain at that point (lat. $38^{\circ} 40' N.$; long. $73^{\circ} 45' W.$) until information is received from the scouts.

The following will be used as scouts, leaving light-ship at hour of fleet departure: E1, E2, E3, B1, B2, C1, C2, C3, D1, D2, D3, D4, D5. (See courses and distances below.)

The general orders to the scouts are to pick up information regarding the Blue detachment from Chesapeake Bay, not to be deceived by false movements, to guard against surprise and capture, and to convey to the Red admiral by the shortest practicable route, either direct or through intervening scouts, by gun fire, signals, etc., all the movements of Blue. When this duty is done, the scouts will rally on the advancing main fleet and await orders.

Orders to scouts.

E1, course SSW. $\frac{1}{4}$ W. (at 13 k. for three hours, then full speed).

E2, course S. $\frac{1}{2}$ W., full speed to latitude $37^{\circ} 10' N.$

E3, course S. by E. full speed to latitude $37^{\circ} 10' N.$

All the above to run to latitude $37^{\circ} 10' N.$, unless enemy is sooner discovered.

D1, course SE. by E. for 39 miles.

D2, course SE. $\frac{1}{2}$ E. for 32 miles.

D3, course SE. for 40 miles.

D4, course SE. for 46 miles.

D5, course SE. by S. for 44 miles.

C1, course SE. by S. for 59 miles.

C2, course SSE. for 48 miles.

C3, course S. by E. for 30 miles.

B1, course SSE. for 67 miles.

B2, course S. by E. $\frac{1}{2}$ E. for 85 miles.

In case the enemy is not sighted before reaching latitude $37^{\circ} 10' N.$ —

E1 will make course for fleet via C3.

E2 will make course for C2.

E3 will make course west for 25 miles, then to fleet via B1.

All other scouts to hold position until relieved.

PLAN OF BLUE.

Before getting under way at midnight the commander in chief, who is with southern Blue, directs northern Blue squadron to assemble at Gay Head by 4 a. m. October 2. The southern Blue, after getting under way at midnight, proceeds up the coast to the vicinity of Hog Island and Assateague lights, at which place there are signal stations that have been previously instructed and arrangements made to keep the southern Blue scouts posted about the movements of Red and to have this information awaiting the arrival of Blue's scouts in the early morning of October 2. The commander in chief of Blue should receive, in the early morning of October 2, the movement, if any, of Red.

If it is ascertained that Red is still at anchor or has sailed and proceeded to the northward, following the coast, the Blue squadrons will follow plan 1.

If the Red squadron, when last seen, was standing to the eastward with the evident intention of preventing a junction of Blue squadrons at a sea rendezvous, Blue squadrons will follow plan 2.

Plan 1.—The northern and southern Blue squadrons to steam to a rendezvous in latitude $37^{\circ} 39'$ north, longitude $71^{\circ} 10'$ west, and there form a junction.

Plan 2.—The northern squadron inside passage and southern squadron proceed along the coast and form a junction off New York.

After junction of A's, B's, C's, and E's of Blue squadrons, pick up ⁷flotilla.

It is assumed that as long as any vessels of either squadron of Blue are on the coast they are in touch with each other. Also, that the ⁷Blue squadrons acting off the coast of their own country have the full assistance of ⁷the Coast Signal Service and all the advantages accruing to operations on a friendly coast.

Order given in writing to senior officer of southern Blue gunboats before midnight October 1:

“Remain in Chesapeake Bay. Keep in readiness to move on telegraphic orders to point designated.”

[Blue telegrams. Sent before midnight October 1.]

“*To Northern Blue:*

“Assemble outside Gay Head at 4 a. m. to-morrow and await orders from shore signal station.

“Commander in Chief.”

“5 a. m., OFF ASSATEAGUE LIGHT.

“*To Northern Blue:*

“Send gunboats inside passage New York and assemble them off Sandy Hook with rest of squadron. Follow plan 2.

MOVEMENTS OF SQUADRONS.

FIRST MOVE.

[Twelve hours. Midnight, October 1, to noon, October 2.]

Red received word of the sailing of Blue at 3 a. m. October 2. Dispersed scouts as per plan. At 10 a. m. October 2 E1 returned to fleet, bringing C3 and D2 and news of the sighting of large Blue force at daylight in latitude $37^{\circ} 55'$, longitude 75° bearing SSW. On receipt of this information the main body steers NNW. to Position I, leaving 1 E on post as rendezvous.

Blue's northern squadron proceeded to assemble off Gay Head and was there awaiting orders at 4 a. m. October 2. Southern squadron sailed at midnight October 1, and proceeded north according to plan. Was sighted at daylight by a Red E, which returned to its fleet (2). 2 E's, from Chesapeake, left at midnight, inside passage north, keeping touch with shore. At 6.30 a.m. Blue 2 E's off Annateague learned that Red fleet had disappeared from off entrance to Delaware Bay, smoke having been reported seen due east, and in consequence Blue commander in chief telegraphs his northern squadron to “follow plan 2,” and himself keeps on to the northward and eastward, preceded by 1 E, with 1 E on his right flank, 15 miles distant, and moving at the same speed as the fleet. At 7.30 a. m. October 2 the northern Blue squadron receives telegram from his commander in chief to “follow plan 2” and proceeds down through

Sound to form junction with him. The southern D's left in the Chesapeake sail north at 10 knots, best allowed speed, to join main body. Position I, noon, October 2.

SECOND MOVE.

[Six hours. Noon to 6 p. m. October 2.]

Red commander in chief dispatches 1 B southwest at full speed with orders to continue for 60 miles if nothing be seen. At 1.30 Red commander in chief sees smoke of a fleet to the southward and westward, apparently standing to northward and eastward, and at 2 p. m. sees 1 E of the enemy bearing south from him. At 1 p. m. Red B sees smoke of a fleet to southward and westward, fleet apparently standing to northward and eastward; he continues for one-fourth of an hour longer to make out the Blue main body and then returns at full speed to his commander in chief, to whom he communicated his news at 2 p. m. Upon receipt of this news, and reenforced by his B just returned, the Red commander in chief steers to southward and westward ahead of the enemy's course, keeping in touch with him and attempting to bring him to battle. Blue's fleeing into the Delaware prevents this and prevents, for the time, the junction of the two Blue squadrons, so the arbitrator rules that Red wins.

Blue main body, keeping on north at 10 knots, sights a Red B to northward and eastward at 1.15 p. m. At the same time the commander in chief of Blue sights the smoke apparently of a large fleet bearing about northeast. The Blue E on right flank of main body sights the Red B at 1.30 standing to southward and westward, and at the same time sights Red fleet's smoke. He turns to westward and joins his commander in chief with this news. The Blue commander in chief at once changes course and steers for the entrance of the Delaware, within which, directed by his pilots, he takes refuge, being followed at about 20 miles distant by Red's main body in superior force.

Red wins.

STRATEGIC SITUATIONS—COMBINED OPERATIONS.

With the cordial cooperation of Colonel Hasbrouck, commanding Fort Adams, the officers at that post and those in attendance, strategic situations in combined operations were worked out, the data for these being taken from the principal problem for the year.

The solutions are confidential and are not published in the Abstract.

NAVAL TACTICAL SITUATIONS.

The consideration and study of naval tactical situations was continued as in previous years, and upon the same lines, though more time was devoted to them than formerly.

These situations, modeled upon the military tactical problems of Von Moltke, are intended as an exercise for the mind in quick

Scale of Miles
0 30 60



discernment of the salient features of a tactical situation, and as counteracting the tendency to overdeliberation.

Many of the problems for this year were located on the Atlantic coast, as offering a more varied field; but a number of them presented problems in tactical dispositions within the waters embraced by the problem for the year. A half hour was the time limit allowed for the consideration of any problem, after which individual solutions were submitted.

The college recognizes the very great value of these situations; they offer a mental training second to none of those methods of professional work here presented. The great benefit to officers from continued study of them is yet scarcely appreciated by some, but no other mental exercise can possibly so well produce readiness of mind and sound and prompt judgment in emergency, marked qualities of the German officers, students of Von Moltke, during the Franco-German war.

This class of work will continue to be developed, the situations varied, and their number increased, and their study continued during the coming year.

MILITARY EXERCISES.

Rather late in the summer a course on Minor War on Land was taken up as essential:

First. To the success of the operations of landing parties.

Second. To a proper appreciation of the soldier's point of view, whether as a coadjutor in combined operations, or as an enemy in coast war.

Third. To serve as a basis for the comparison of tactical operations afloat with those ashore; to assist in the development of naval tactical problems and games.

The scheme covered the following:

(1) The various military war games and practice with same, as Livermore's, Swift's arrangement of that of "Verdy du Vernois," and others.

(2) The working out of tactical problems; method of analyzing the situation; deciding upon the plan of action, and writing of necessary orders to carry it out.

(3) Study of terrain; use and making of maps; making of relief maps, especially in working out tactical problems; the making of reconnoissance reports.

(4) Field engineering, using Beach's Manual, particularly as applicable to naval use in landing stores and troops, the making of field fortifications, bridging streams, etc. Models of landing stages, bridges, fortifications, etc., were made.

(5) The working out of reconnoissance, patrol, and outpost guard work, following Von Arnim's Extracts from the Journal of an Infantry Captain, on large scale maps.

Among the authorities followed besides those mentioned were Wagner, Gall, Shaw, Cleary, and Von Donat (Tactical Problems).

INTERNATIONAL LAW COURSE.

The work in international law during the summer of 1900 consisted of a series of lectures upon the whole subject as applicable to naval officers, either directly as prime agents of the Government, or indirectly as advisers or military agents in support of the diplomatic and consular officials. It must be borne in mind that the responsibility of any military action in support of a civil official of the Government remains alone with the naval official, and he must be prepared to judge intelligently in all such cases.

In addition to the series of lectures certain situations were prepared for solution by the officers in attendance upon the course. These situations in international law were either based upon actual cases that had taken place in the course of cruising, in active service by officers, or ones likely to take place under certain circumstances.

Finally, a course of reading in international law was recommended to the officers in attendance and it was found that, stimulated by the lectures and situations above referred to, the library of the War College was much used in this connection.

The course of lectures was made more interesting from the various discussions that had arisen between various naval and international law experts incidental to the preparation and formulating of a code of the laws and usages of war at sea, by the lecturer. Some of the more prominent prize cases arising from the Spanish-American war had been settled by discussions of the Supreme Court of the United States in decisions of great value and far-reaching consequence. Among those quoted were those upon the *Paquete Habana* and the *Olinde Rodrigues*, which established definitely for the United States rules of international law regarding the exemption of coast-fishing vessels innocently employed, the effective nature of a blockade, and the spoliation of papers.

Since the publication of Snow's Cases on International Law various precedents and cases have arisen in the Chino-Japanese, Spanish-American, and South African wars that would make a new volume of more recent cases and precedents valuable to the naval service, and this volume is now in course of preparation.

The lectures upon Insurgency, by Professor George G. Wilson, were upon a subject closely connected with the ordinary cruising of naval officers in Spanish-American and other Latin countries. It may be termed, however, a new and growing subject, so far as its definite treatment is concerned, within the realms of international law. Very little literature exists upon the subject, and much light is still wanted, as insurgency fades away into violations of municipal law or expands into belligerency, civil war, or a definite establishment of independence. The substance of Professor Wilson's lectures will be printed and issued to the service.

TORPEDO INSTRUCTION.

By the cordial cooperation of Commander Mason, in charge of the Torpedo Station, all the officers in attendance at the War College were offered the privilege of taking the same course of instruction in torpedoes as was prescribed for officers ordered to the Torpedo Station for instruction.

This work was especially interesting during the past summer, owing to the recent advances made in torpedo construction, tending toward the greater efficiency of the torpedo as a weapon, and to the presence at the Naval Torpedo Station of a flotilla of torpedo boats in commission, the latter affording opportunities for practical exercises in target firing underway, in flotilla maneuvering by day and night, and in night attack and defense, as presented during the recent maneuvers in conjunction with the North Atlantic Squadron and the fixed defenses of Narragansett Bay.

COMBINED MANEUVERS.

Having received the sanction of the Navy Department, combined operations were arranged for the vicinity of Narragansett Bay, which included the resources, matériel, and personnel of the North Atlantic Squadron, of the fixed defenses of Narragansett Bay, the Naval Training Station, and the Torpedo Station and flotilla; the officers in attendance and of the staff of the War College acting as umpires, so far as

their numbers allowed, the whole being under the direction of Rear-Admiral Farquhar, the commander in chief of the force on the North Atlantic Station. Several problems were submitted to the latter by the War College, and after conference with the commandants of the stations involved the following was selected:

PROBLEM FOR MANEUVERS—NEWPORT, R. I., 1900.

GENERAL IDEA.

A very superior Red fleet is blockading a Blue force in Narragansett Bay.

Information from a reliable source is received by the Blue commander in chief that it is the intention of Red to force the entrance channel with his entire fleet, during darkness, and attack Blue inside. Further information received places the date of the attack subsequent to September 20, during the last quarter of the moon. After that date a vigilant lookout is kept by Blue, afloat and ashore, and every preparation is made to resist the attack of Red's superior force. West passage, Dutch Island Channel, is closed to all except torpedo boats.

SPECIAL IDEA—FIRST PHASE.

The Blue commander in chief at once orders a night attack by the torpedo flotilla upon the Red blockading fleet outside, which is executed within a week, the special occasion being decided upon by the commanding officer of the flotilla, and approved by the commander in chief. Information as to the date and hour of attack is sent to the commanding officer of fixed defenses.

SPECIAL IDEA—SECOND PHASE.

The commander in chief of the Red blockading fleet, knowing approximately the cleared opening in the mine fields of the main channel, forces the entrance with all his ships and torpedo flotilla, and advances to attack the Blue fleet inside. This advance is met by the full strength of the Blue forces afloat and ashore.

INFORMATION TO BE OBTAINED.

1. For the fleet: The most effective use of the searchlight in guarding against night attack, and in use against gun pointers on shore; how directed and controlled in both cases; as to plan followed in running past the forts (i. e., formation, distance, speed, etc.); the use and effectiveness of wireless telegraphy, and the pigeon service.

2. For the forts: Practical test of the adopted system of "fire command" and "fire control;" determination of the arcs of the most effective fire from each battery, based upon the opinions of the umpires as to the chances of hitting the enemy at various ranges; means of controlling the action of the mines; signal and other communication between batteries, and between the ships and the shore; best use of the searchlight in detecting the approach of an enemy; their best location, who directs them, and how.

3. For the flotilla: Possibilities of such a night attack; the embarrassment found in searchlights; how best to avoid such lights; the efficiency of certain tactical formations; necessity of homogeneity in a flotilla; suggestions for rules for future exercises, as deduced from results of these exercises.

DETAILS OF PROBLEM OF MANEUVERS.

A board of arbitrament, for the general guidance and control of the maneuvers, will be formed, and consist of the following officers:¹

Chief of staff of North Atlantic Squadron.

President Naval War College.

Commanding officer of fixed defenses.

Commanding officer of Naval Torpedo Station.

Lieutenant Ellicott, recorder.

Dates between the 20th and 30th of September (after the last quarter of the moon) will be designated for the maneuvers, one night being specially designated for Blue's attack upon the Red blockading fleet outside; another for the forcing of the entrance channel and the passage of the forts by the Red torpedo-boat flotilla and fleet in an attack upon the Blue inside.

At the discretion of the board of arbitrament the maneuvers will be preceded by a day rehearsal, as it is thought that much important information in regard to the details of observation and recording data may be gained thereby, and much subsequent confusion as to the duties of umpires be avoided.

The location of the mines will be shown on the chart, and the cleared opening in the mine fields known, only approximately, to the Red admiral.

The Red blockading fleet, under the command of the senior officer present, appointed by the commander in chief of the North Atlantic Squadron, will consist of the following ships: *Kentucky*, *Indiana*, *Texas*, *Scorpion*.

The Blue, or home fleet, under command of the commander in chief of the North Atlantic Squadron, will consist of the following ships: *New York*, *Massachusetts*, *Kearsarge*, *Vicksburg*, *Leyden*.

The torpedo-boat flotilla will consist of six boats and the submarine boat *Holland*, under the immediate personal command of the inspector of ordnance commanding the torpedo station, or of a representative appointed by him. The flotilla, when so ordered, will report to the commander in chief of the North Atlantic Squadron for temporary duty during the maneuvers.

After previous notice, and upon signal being made from the commander in chief, the Red fleet, equipped, provisioned for a week, and with umpires on board, will get underway and take station, as directed, outside the harbor and off the entrance to Narragansett Bay. Under the immediate and personal command and directions of the Red commander in chief, the vessels will be disposed as for a close blockade of the port, and for successfully repelling any attack by the torpedo-boat flotilla, which is known to be inside the harbor. With this end in view, the Red commander in chief is authorized to issue all necessary orders and directions.

The ships of Red are, of course, representative of a much larger number—twice or thrice that of Blue—and they may be disposed accordingly.

Umpires will be detailed, one or more for each ship, torpedo boat, and shore battery, and always from other than their own particular ships or station.

¹ Capt. F. E. Chadwick was subsequently added to the board and became its president.

The commanding officer of fixed defenses will be notified of all dispositions and arrangements made at any time by the Blue commander in chief afloat, and vice versa. Red's dispositions and arrangements will, of course, be unknown to either, except such information as may be obtained from lookout stations, picket, and scout vessels.

Ready, accurate, and prompt means of communication between the forts and ships being of the first importance, a system is suggested for experiment. This code is known to Blue alone, and it is to be made familiar to the officers of both forts and ships and to their signal corps.

There must be no signaling between the forts and the torpedo boats on maneuver nights. The time and plan of attack must be known to the forts, and no signaling will be necessary.

The night letter, correctly exhibited, will always be accepted by the forts as "O. K."

INTERSERVICE SIGNAL CODE.

A lookout station will be established at Beaver Tail. This detail will consist of one officer and three men from the fleet, supplied with signal kit, rockets, and Very's signals; or

The *Leydon* will be detailed as lookout and picket vessel for the Blue, and will be equipped as the commander in chief may direct.

The army and navy code is adopted for communicating between the ships and the shore.

Special signals will be agreed upon for communicating between the lookout station at Beaver Tail and the ships or the shore.

NIGHT AND DAY SIGNALS, NIGHT LETTERS, ETC.

In adopting a system for the "night letters" the initial letter of the corresponding day of the week may be used, or some word of ten letters as covering the period of maneuvers, no letter of which requires an exhibit of less than two or more than three lights.¹

The senior officer ashore will be temporarily in command of all the fixed defenses guarding Narragansett Bay, and will be given such authority and assistance in men and officers as may enable him to man all the guns of all the forts and their equipment of search lights, etc.

Mariners will be notified, in the customary public notices, of the approximate date of the maneuvers and of the theater of operations, and cautioned to use special vigilance in navigating in that neighborhood.

The greatest care and vigilance is enjoined upon all concerned to prevent accident or collision.

GENERAL INSTRUCTIONS.

1. Upon signal, or when specially directed by the commander in chief, the fleets will take stations as previously directed, and will at once make every necessary preparation required for the working out of their part in the maneuvers, and take

¹ To be arranged and agreed upon by the commander in chief North Atlantic Squadron and commanding officer of fixed defenses.

all necessary precautions, as in time of war, to prevent accident or collision with vessels cruising in the neighborhood.

2. The code of signals arranged for communication by day and night between the forces afloat and those ashore is to be made familiar to all concerned.

3. The plan of attack of the Blue torpedo-boat flotilla will be known only to Blue, and the scheme of attack well understood by the officers of the flotilla. Red's defense against it will be worked out by the officer commanding Red's force, and is to be unknown to Blue, although information regarding Red's general system of blockade, his routine habits, methods of defense, etc., should be learned from the forts' signal and lookout stations and communicated to Blue commander in chief.

4. Blank charges of black powder from small guns will be fired from both ships and forts at proper intervals to simulate the firing of the heavy guns (see rules), care being observed to make a proper time allowance between shots of the large calibers for loading with shell.

5. Coast Survey Chart No. 353-2 will be used. Circles of range of fire for 500, 1,000, 1,500, 2,000, 2,500, and 3,000 yards from batteries of all fixed defenses will be drawn on this chart. All ships and umpires will be provided with copies of this chart so marked.

6. In the maneuver of forcing the main channel and passing the forts, commanding officers will observe great care in noting:

- (a) The position of the chart every three minutes.
- (b) The efficiency of the equipment of the guns and the rapidity of fire.
- (c) Whether or not it is possible to point the guns accurately at night and in front of the shore search lights.
- (d) The efficiency of the system for the control and use of the search lights aboard ship under such circumstances.

7. Special, full, and detailed reports will be submitted by the commanding officers of all ships and torpedo boats upon all subjects mentioned in the Problem of Maneuvers as desirable "for the fleet" and "for torpedo boats." Such reports will contain any and all suggestions offered by themselves or by officers of their commands.

8. Picket, scout, or torpedo boats under fire of forts or ships must be closely watched by all umpires; the time and opinions noted to be afterwards compared. Boats put out of action by an umpire will at once retire with all lights burning and take no further part in the operations for that occasion.

9. Ships coming under fire of the forts will be watched closely by the umpires on the ship and on the forts, the times of opening fire and synchronous positions of the ships noted, and results afterwards compared.

10. Umpires will be stationed at the fixed defenses, as ordered, to note particularly:

- (a) The times of firing of the batteries.
- (b) The positions of the target.
- (c) The time the targets are under fire.
- (d) Positions of other ships in the formation.
- (e) Make notes at the time upon all movements, to be elaborated afterwards.

11. The efficiency of the systems of communication between the ships and the forts

will be particularly noted and commented upon, and all suggestions toward improvements will be added thereto.

12. At the close of each phase of the maneuvers, commanding officers will submit notes and suggestions in regard to the same, and a meeting will be held of the board of arbitrament. A general conference of this board will dictate a general order criticising the phase just past, and may, with a view to improvement along certain lines of tactical development, direct a repetition of the same phase, thus thrashing out some one or two points before proceeding to others.

Rules for guidance of umpires.

TABLE I.

Class.	Can put out of action.	At distance.	In time.
1 A and 1 C.....	1 A	2 miles.....	1 hour.
1 A	1 B	3 miles.....	1 hour.
1 A	1 C	3 miles.....	30 minutes.
1 B and 1 C.....	1 B	2 miles.....	30 minutes.
1 B	1 C	2 miles.....	20 minutes.
2 C	1 C	2 miles.....	20 minutes.
A B or C.....	1 t. b.....	2,000 yards ...	3 minutes.
A B or C.....	2 t. b.....	2,000 yards ...	5 minutes.
1 t. b.....	A B or C.....	500 yards.....	(a)

a Undiscovered or inside time limit. Very signal to be burned in this case.

TABLE II.

Shore gun.	Can put out of action.	At distance.	In time.
2 12-inch.....	1 A	2 miles.....	30 minutes.
2 12-inch.....	1 B	2 miles.....	20 minutes.
2 12-inch.....	1 C	3 miles.....	15 minutes.
2 10-inch.....	1 A	1 mile	30 minutes.
2 10-inch.....	1 B	1 mile	20 minutes.
2 10-inch.....	1 C	1½ miles.....	15 minutes.
1 8-inch.....	1 B	500 yards	30 minutes.
1 8-inch.....	1 C	1,000 yards....	15 minutes.
1 torpedo boat is put out if under fire from			
2 or more R. F. guns for 3 minutes at 2,000 yards.			

A = battle ship; B = armored cruiser; C = protected cruiser; t. b. = torpedo boat.

TABLE III.

Time interval allowance between rounds for guns:

Small R. F., 15 seconds.

4. 7 R. F., 30 seconds.

8-inch M. L. R., 8 minutes.

8-inch B. L. R., 3 minutes.

15-inch S. B., 10 minutes.

10-inch B. L. R., 4 minutes.

12-inch B. L. R., 5 minutes.

12-inch B. L. M., 5 minutes.

(a) The time of opening fire from either forts or ships will be indicated by a blank charge of black powder only, fired in the direction of the target, and the time will be noted by the umpire present.

(b) Ships or forts continuing fire will indicate it by firing a blank charge of black powder in the direction of the target, according to article 4. In case of ships, the position will be indicated on the chart at every gun and the time noted; in the case of forts, the times of each gun and the particular target fired at will be noted.

(c) Effective torpedo range is 500 yards. A boat firing a torpedo (indicated by shooting a red star) within this range scores a hit; the time and revolutions to be taken from the instant of firing the red star to time of passing the enemy or passing close by; this, of course, necessitating the continuance of the run toward the quarry after firing the torpedo.

(d) When a ship discovers a torpedo boat she will fire a green star toward that boat and note the time from the firing until the torpedo boat passes or stops near by. The ship will, if possible, note the time when each boat fires a red star, being careful to distinguish the boats.

(e) Whenever a green star is fired by a ship a blank charge of black powder from a rapid-fire gun on that ship shall immediately follow. No other charges will be fired, but the exercise of aiming and firing rapid-fire guns shall be carried on as in real action. It is not considered advisable to fire blank charges, except saluting charges of black powder, as the ordinary service charges of rapid-fire guns fired without projectiles do not raise a sufficient pressure in the gun to burn up more than a portion of the charge, the remaining grains of powder, in some cases quite large, acting as so many projectiles.

With the sanction of the War Department, in order to facilitate the operations, the artillery defenses of Narragansett Bay were constituted an artillery district under command of the senior officer present during the period of the maneuvers.

The programme was fully carried out on the nights of September 24 and 25, and a detailed report was submitted by the board of arbitration to the commander in chief of the North Atlantic Squadron, a duplicate copy of it being filed with the college archives. This report included the reports, comments, and criticisms of all commanding officers and umpires, and the proceedings of a conference on the maneuvers held subsequently at the college. It is necessarily of a confidential nature, but is available to the naval and military services for professional purposes at the sources mentioned.

At the request of the commander in chief of the North Atlantic Squadron the phases were interchanged, the second being carried out first. The following extracts from the report of the board of arbitration are given as a narrative of the operations:

“The disposition of the Red forces for blockade and attack during the second phase was in accordance with Squadron General Order, No. 1, of the Red commander in

chief. The torpedo-boat flotilla was divided into two divisions. One, consisting of the *Porter*, *Rogers*, *Morris*, and *Gwin*, rendezvoused after dark to the westward of Whale Rock, and the other, consisting of the *Dahlgren* and *Stiletto*, rendezvoused near Brentons Reef light-ship.

"The disposition of the Blue forces for defense during the second phase was in accordance with the special order of the Blue commander in chief and the defense scheme of the commander in chief of the Blue land forces. After nightfall the vessels of the Blue fleet occupied the following positions:

"*New York* (flagship) at anchor about one-third of a mile WSW. of Goat Island light.

"*Massachusetts* at anchor about one-fourth of a mile ENE. of Fort Adams fog bell.

"*Vicksburg*, representing a first-class battle ship, under way in Eastern Passage between Gould and Rose islands.

"*Leyden*, representing a first-class battle ship, at anchor one-fourth of a mile north of the outer Dumping Rock.

"*Holland* at torpedo station and not used during second phase.

"A signal party, with an adequate force for protection, was stationed at Beaver Tail light-house. The battery commander at Fort Greble stationed signal parties at the south point of Fox Hill and in a catboat off The Bonnet in the Western Passage to report torpedo boats by special flare-up signals not likely to be noticed by the enemy.

"The weather was fine; a dark starlight night; few clouds; light northerly air; sea smooth.

"At 9.15 p. m. the torpedo-boat division near Whale Rock started up the Western Passage, each boat cruising at the discretion of its commanding officer, the *Porter* in advance, followed by the *Gwin*, *Morris*, and *Rodgers* in the order named. At 9.41 p. m. their approach was signaled to Fort Greble from The Bonnet without their suspecting it. The *Porter*, *Gwin*, and *Rodgers* attempted to run by to westward of Dutch Island, and the *Morris* to eastward. All were discovered by the searchlight at Greble and engaged by its batteries, and all except the *Rodgers* were put out of action. The latter rounded the north end of Conanicut Island and, standing down the Eastern Passage, encountered the *Vicksburg* and attempted to torpedo her, but was discovered by that vessel and put out of action.

"At 10.30 p. m. the *Dahlgren* and *Stiletto* left the vicinity of Brentons Reef Light-ship for an attack through the Eastern Passage. The former, when passing close to Castle Hill Light at 10.48 p. m., was discovered by the two Blue picket launches, colliding with one of them, and these gave the alarm. She was quickly picked up by the searchlights of Forts Adams and Wetherell, and put out of action by their guns and those of the *Massachusetts*. The *Stiletto*, having parted company with the *Dahlgren* at 10.40, stood over to the west side of Mackerel Cove entrance, thence to the vicinity of Southwest Point, and thence eastward, hugging the shore, toward Fort Wetherell, being discovered and fired upon by that fort at 10.52 p. m. The *Stiletto* was under fire from Wetherell for two minutes. At 10.57, while running for the *Massachusetts*, she was fired at by Fort Adams and was under fire for one minute fifteen seconds. At 10.58 she was discovered by the *Massachusetts* and fired

upon, but successfully torpedoed her and put her out of action. Then, her commanding officer and helmsman being blinded by a concentration of searchlights upon her, she was accidentally steered into the permanent wharf at Fort Adams, sustaining injuries that put her out of action.

“At dusk the *Scorpion* received on board a small landing party from the *Texas*, consisting of an officer and boat’s crew, which, at about 8 p. m., attempted to capture the Blue signal station at Beaver Tail, but was repulsed.

“At 7.30 p. m. the *Scorpion* and *Eagle* took prearranged stations for observing the harbor, the former 1 mile southwest of Beaver Tail Light and the latter about 1 mile southeast of Brentons Reef Light-ship, keeping the beams of a searchlight from each steadily directed up channel to a point of intersection northwest of Castle Hill. At 10.30 p. m. the Red fleet formed for attack and advanced in column, *Kearsarge* (flagship) leading, followed in the order named by *Kearsarge A*, *Kearsarge B*, *Texas*, *Texas A*, *Texas B*, *Indiana*, *Indiana A*, *Indiana B*, *Eagle*, *Eagle A*, *Eagle B*, *Scorpion*, *Scorpion A*, and *Scorpion B*, the *Eagle* and *Scorpion* extinguishing their searchlights as the leading vessel approached the apex of the intersecting beams, and then taking their places in column.

“At 11.01 the approach was signaled to the Blue forces from Beaver Tail, and at 11.07 the *Kearsarge* was picked up by the Fort Adams searchlight, and fire was opened upon her. Under the rules of the problem all Red vessels succeeded in forcing the entrance without being put out of action, although all were quickly discovered and under fire and suffered punishment.”

The Red fleet resumed blockade for the purpose of carrying out the programme for the first phase on the evening of September 25.

“The weather was fine; bright starlight; visibility good; nearly calm; sea smooth and with a great deal of phosphorescence.

“The Blue torpedo boats *Dahlgren*, *Porter*, *Rodgers*, *Morris*, *Gwin*, and *Holland* left the harbor at the discretion of their commanding officers, between 6 and 7 p. m., to make individual attacks upon the vessels of the Red blockading fleet. The *Leyden* proceeded to the vicinity of Brentons Reef Light-ship as a decoy vessel to cause Red ships to use their searchlights upon her. This the *Eagle* did for a moment and was soon afterwards attacked by the *Gwin* and *Dahlgren* and put out of action by the former at 6.55 p. m. At 7.07 the *Dahlgren* was discovered by the *Indiana* and put out of action. At 7.35 the *Leyden* was attacked and put out of action by the *Scorpion*. At 7.57 the *Gwin* successfully torpedoed the *Scorpion*. Between 8.31 and 8.33 p. m. the *Kearsarge* was attacked by the *Morris*, *Rodgers*, and *Gwin*, but put them all out of action.

“Owing to a misunderstanding of the rules by the umpire of the *Dahlgren*, she was directed by him to continue hostilities after being declared out of action by the umpire of the *Indiana*. She subsequently torpedoed the *Kearsarge*. The umpire of the latter, ignorant of the disqualification of his assailant, adjudged a successful attack, and the *Kearsarge* started for Newport with running lights displayed. Soon afterwards the *Holland* was encountered, making claim to have torpedoed the *Kearsarge*. The board was compelled to disallow this claim because the *Kearsarge* was off her

guard and illuminated, but the board coincides with the opinion of the umpire, captain, and officers of the *Kearsarge* that the *Holland* would otherwise have succeeded, and probably without detection. The result of the operations of the first phase was a loss to the Red fleet of two vessels and a loss to the Blue flotilla of four torpedo boats and one decoy vessel."

The maneuvers were conducted under rules which, for want of trial, were imperfect. These imperfections were made apparent and will be corrected, but they did not mar the success of the operations, from which valuable lessons have been learned by those who participated, and have been recorded in the report. The college trusts that such maneuvers will hereafter form part of each summer's course.







